

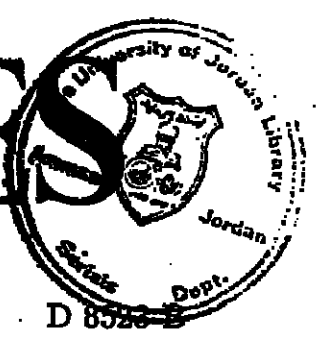
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Belgium	100.00	Italy	1110	Portugal	100.00
Canada	50.00	Japan	100.00	S. Africa	100.00
France	100.00	South Korea	100.00	Singapore	100.00
Germany	100.00	Taiwan	100.00	Thailand	100.00
Greece	100.00	USA	100.00	UK	100.00

FINANCIAL TIMES

EUROPE'S BUSINESS NEWSPAPER

No. 29,045 Monday April 11 1983



Computers in
Business:
Section III

NEWS SUMMARY

GENERAL BUSINESS

U.S. steps up arms supplies to Thais

The U.S. is stepping up arms supplies to Thailand, the latest in a series of moves to support the Thai government's fight against the Communist Party of Thailand. The U.S. is providing a large quantity of arms and ammunition, including anti-aircraft missiles, to the Thai government. This is part of a broader U.S. policy to support the Thai government's efforts to maintain its sovereignty and stability.

\$175m plan for Italian smelters

ITALIAN Government allocated \$175m (£115m) to restructure the troubled aluminium industry. The plan includes the closure of several smelters and the restructuring of others. The government is aiming to reduce the industry's losses and improve its competitiveness in the international market.

Training base claim

The U.S. plans to establish a military base in Honduras to train Central American forces. The base is intended to provide training and support to the armed forces of Central American countries, particularly in the context of the ongoing conflicts in the region.

\$1.7bn weapon plan

The Pentagon is to go ahead with the \$1.7bn Copperhead missile program. The program involves the development and production of a new family of missiles, designed to provide the U.S. with a more flexible and powerful missile capability.

Data protection move

The UK Data Protection Bill starts its second reading in the House of Commons today. The bill aims to regulate the collection, storage, and use of personal data, ensuring that individuals' privacy is protected.

Gulf oil slick bid

Kuwait's Health Minister, Abdul-Rahman al-Ahmed, started a crisis shuttle to warn neighboring Iran and Iraq to stop the oil spillage from damaged Iranian wells. The spillage poses a significant threat to the environment and the health of the populations in the region.

Malta bar

Malta refused entry to Sam McCusker, UK Labour Party chairman, and National Union of Seafarers assistant general secretary. The refusal is based on the grounds that McCusker is involved in activities that are considered to be in the interests of the state.

Afghanistan initiative

Indirect talks aimed at ending the conflict in Afghanistan are to start today under the auspices of the United Nations. The talks are intended to bring the warring parties to a negotiated settlement and end the prolonged conflict.

Lead level studies

Atmospheric lead levels have no statistically significant effect on city children's intelligence, according to UK studies. The studies found that while lead levels are a concern, they do not appear to have a direct impact on children's cognitive abilities.

Rumasa files found

Police hunting a kidnapper in Madrid found files of the Rumasa group that were reported missing after the Government took over the company in February. The files are believed to contain information that could be useful in the investigation.

Marseilles chase

A Polish gunman who fired at an office of the Soviet airline Aeroflot was arrested after a car chase through Marseilles. The incident caused significant concern and disruption in the city.

Dressing down

Soviet youths were "desecrating" their country by wearing T-shirts labelled "U.S. Marine Corps" and "Britannia rules the waves," said the army newspaper Krasnaya Zvezda (Red Star).

Amin plans return

Former Ugandan dictator Idi Amin said he plans to return to the country to lead underground opposition groups. Amin's return is seen as a potential threat to the stability of Uganda.

Briefly

Storm killed three people and injured 40 in Dhaka, Bangladesh. Northern Ireland bomb destroyed a garage in Omagh, the second bombing in the town in 24 hours. Eritrean Popular Liberation Front said it killed 2,500 Ethiopian troops in recent fighting.

Communists to press Mauroy over austerity

BY PAUL BETTS IN PARIS

After a week of extremely vocal public protests and stormy negotiations, the Finance and Economy Ministry and the travel agents' federation finally reached an agreement which eases the new foreign exchange restrictions for French tourists travelling on package holidays. The agreement applies to all package holidays advertised before March 25 - the day the Government unveiled its austerity package and the highly controversial foreign currency travel limit of FF2,000 (\$275) a year for French tourists. Under the compromise, French tourists will be able to book themselves on any package holiday with meals and accommodation included and have between FF1,250 (for half board packages) and FF1,750 (for full board) deducted from their FF2,000 annual foreign currency allowance. "At least the French will be allowed one trip outside the country this year," one travel agent remarked. Whether a French tourist goes to the South Pacific or to Spain, the foreign currency deductions are the same for all package holidays. As for the travel agents, they will be allowed to convert into foreign currency 75 per cent of funds they spent on travel packages between April and October of last year. Although a large number of travel agents are still not satisfied, the compromise appears to have appeased the French travel industry. For their part, the large French trade union confederations are continuing to debate their approach to the Government's austerity measures. The pro-Communist CGT, which has made no secret of its distaste for the package, appears to be ruling out at this stage industrial action on a national scale against the measures. Instead, the CGT leadership is suggesting to its more militant members to act at a local level inside their respective enterprises and to combine local labour demands with a general protest against the Government's latest economic policies.

The Government's victory in the National Assembly vote today is assured by the overall Socialist Party majority in the French parliament. But M Mauroy - whose administration includes four Communist ministers - appears keen to avoid a major rift with his Communist partners in government at this delicate stage in the country's economic life. While it is not clear how far M Mauroy is prepared to go to meet the Communist demands, the Government has managed to defuse its highly publicised row with the French travel industry, which has been in a state of uproar ever since the imposition of the new draconian travel restrictions for French tourists.

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Jordan calls off talks with PLO

BY ROGER MATTHEWS IN RIYADH AND DAVID LENNON IN TEL AVIV

JORDAN has abandoned its efforts to reach a joint response with the Palestine Liberation Organisation to President Ronald Reagan's Middle East peace proposals. Its decision, announced last night, deals an apparently fatal blow to the U.S. peace attempt for the region launched last September.

Earlier yesterday, a further setback to hopes of moderation within the PLO came with the assassination in Portugal of Mr Issam Sartawi, its chief advocate of dialogue with Israel. Mr Sartawi, who was representing the organisation at the congress of the Socialist International, was shot dead by a lone gunman.

Responsibility for the shooting - which occurred in the lobby of the Hotel Moniccho in Albufeira, where the conference is being held - was claimed in Damascus by a renegade Palestinian group headed by Sabri al-Banna, code-named Abu Nidal.

Jordan's announcement, meanwhile, will be seen as a considerable victory for the handling Arab states, especially Syria, which has consistently warned Arab countries and the PLO against becoming involved with the U.S. proposals.

Jordan announced after a Cabinet meeting, chaired by King Hussein, that it was taking all necessary steps to safeguard its national security and it continued to recognise the PLO as the sole representative of the Palestinian people.

The Reagan plan called for King Hussein to state his willingness to negotiate with Israel on self-determination for the occupied West Bank and Gaza. The U.S. opposed an independent Palestinian state, but proposed that self-determination should only be expressed in association with Jordan.

Although King Hussein was anxious to explore the plan, he was unable to win the support of Mr Yasser Arafat, chairman of the PLO. Many Palestinians were deeply sceptical about Mr Reagan's willingness or capacity to force a major change in Israeli attitudes.

Israel rejected the Reagan plan soon after it was announced and has continued to build and develop Jewish settlements on the West Bank and Gaza in direct defiance of American wishes.

The Jordanian decision will be a setback for those Arab states closely associated with the U.S. such as Saudi Arabia. While the Saudis have not publicly urged the PLO and Jordan to respond positively to the U.S. plan, they have been making a particular effort to win over the more radical states.

Pressure is now likely to increase for an Arab summit meeting later this month, at which the member states are expected to reaffirm their own proposals - including an independent Palestinian state - which were agreed in Morocco last autumn.

Jordan made the decision known as Mr Francis Pym, the British Foreign Secretary, ended an official visit to Saudi Arabia. During his talks with King Fahd and Prince

Congress to debate U.S. bank lending

By Anatole Kaletsky in Washington

SWEEPING REFORM of the U.S. system of regulating international lending by commercial banks will be debated by Congress this week.

A series of hearings will follow proposals prepared by the Federal Reserve Board, the Comptroller of the Currency, and the Federal Deposit Insurance Corporation, in response to congressional disquiet over the U.S. contribution to the International Monetary Fund (IMF).

Congressional acceptance of the package presented by the regulators is by no means certain, after adverse reactions over the weekend from some congressmen, who have been seeking even tougher country-by-country limits on bank lending.

However, administration officials are optimistic that in the end they will be able to hold the line against what they feel would be "inconsistent and obstructive" specific legislation, with some modification of the plan proposed by the regulators.

Main elements of this are: ● Closer consideration of country risks by bank regulators and examiners. There will be three new classifications for loans to countries with debt problems. Instead of the present categories "substandard" or "doubtful", which are used to evaluate commercial risks - non-performing country loans will be declared either as a "loss", a "reserveable loan" or a "debt-service impaired loan".

The loss category will be applied to loans which are clearly uncollectable, such as those that have been repudiated by a country. Loans on which interest payments are in arrears for 90 days or more will be classified as "reserveable".

The more important question of policy changes to influence that trend is put aside as outside its terms of reference. The report thus contributes little to the appraisal of the merits of floating exchange rates compared with pegged-rate regimes of the kind prevailing in the European Monetary System (EMS).

Nor does the report analyse the use of the exchange rate as a possible target for domestic monetary policy. It assumes that intervention will be "sterilised" - that is, that it will not be allowed to affect the money supply. It does not explore, however, how successful sterilisation can hope to be in the long run, nor

Study supports intervention on exchange rates

BY SAMUEL BRITTON IN LONDON

CO-OPERATIVE intervention by leading nations, including the U.S., to smoothen out fluctuations in exchange rates is suggested by an expert group of officials set up to study the problem after last year's Western economic summit in Versailles.

The group, which was chaired by M Philippe Jurgensen, a French Finance Ministry official, does not make any formal proposals, but co-operative intervention emerges as a practical possibility from its analysis.

The Jurgensen report is to be published at the end of this month or the beginning of May in time for the next summit, which is to be held in Williamsburg, Virginia. The report is concerned with the limited technical issue of official intervention to reduce fluctuations in exchange rates around trends which are basically determined by market forces.

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does it assess the views of those economists who believe that non-sterilisation would be preferable. British officials believe that the most important aspect of the report is not its precise findings, but the effect it might have in persuading the Americans to pay more attention to the international implications of monetary and fiscal policies, including the effects of the U.S. budget deficit.

British intervention in the market for sterling has been much reduced since Mrs Margaret Thatcher, the Prime Minister, returned from the Falklands earlier this year to find that interest rates had been raised in her absence. Since 1977 there have been numerous switches in British official policy both on intervention and on the role of sterling's rate as a policy target.

The most important material unearthed by M Jurgensen and his colleagues is in the appendices of the report, some of which may be published later. One opinion, by the Bank of England, concludes that its foreign exchange interventions have on balance been profitable another special study reports the views of the major central banks on their intervention experience.

The main finding of the report, however, is that official intervention can be useful but that if the amounts involved are large or the exchange rate movements are very great, wider policy questions arise which cannot be settled by intervention alone.

Even President Karl Carstens, who signed the Census Bill into law, is understood to have deep misgivings and the Supreme Court must tomorrow decide on suits for an injunction against the census. The questions themselves are a compromise between material designed to give a demographic picture

Inquisitive census incenses the West Germans

By James Buchanan in Bonn

How can they govern us if they cannot say that Sigrid does aerobics and Holger's gay? Berlin Cabaret

OVER THE next two weeks, an army of 600,000 officials, policemen, jobless and local busboys will be knocking at the doors of West Germany's 25m households to ask among some 40 other questions, whether the inhabitants are Jewish or have an outside toilet.

This might be a normal event in the life of a modern industrial state, but German officialdom has approached its first census since 1970 with the tact and sensitivity of someone dealing with a large car bomb. It has devised a form that carries name, number and telephone number - this last being voluntary - and will use a mixture of threats and dubious recommendations from businessmen to bully citizens into line.

The April 27 census deadline promises to be the first test of civil disobedience for Chancellor Helmut Kohl's new Government in a year that will be marked by mass protest against the stationing of Nato nuclear missiles in Europe.

However, if the DM 370m (\$152.8m) census does prove worthless, it will not be because of the mass of "alternatives", squatters, pacifists, intellectuals and so on who are planning to brave the DM 10,000 fine or even impersonate census takers on the grounds that they want no more state intervention in their lives. Nor will it be because of the 1.5m Turks who have been told by the new Government that their numbers must be cut by half over the decade.

Instead, many "ordinary citizens" resent and fear any further intrusion into their lives. The 1970 census passed with relatively few objections but since then, mostly as a result of the battle against terrorism in the mid-1970s, the state has built up a complex computer archive, the working of which is not understood by most of the population.

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Continued on Page 16
UK Data Protection Bill, Page 16

Foreign groups to bid on UK regional telephone exchange

BY GUY DE JONQUIERES IN LONDON

FOREIGN telecommunications manufacturers will have their first opportunity to compete for a share of Britain's public telephone exchange market later this year when the Hull telephone department seeks international tenders for its network modernisation programme.

The bidding is expected to pit System X, the all-electronic digital exchange developed for British Telecom, against rival products offered by several Western European and North American companies.

Hull telephone department, part of Kingston-upon-Hull city council, operates Britain's only independent public telephone system. It serves more than 100,000 subscribers in a 120-square mile area north of the River Humber.

It plans to invite tenders this summer, initially for three exchanges worth about £10m (\$15m). These will be followed later by contracts worth several times as much for the rest of its modernisation programme, due to be completed by the mid-1990s.

The department was in advanced negotiations with Standard Telephones and Cables (STC), long its principal supplier, for the supply of two System X exchanges, until STC pulled out of System X product last autumn.

The company is now expected to tender System 12, the digital exchange developed by International Telephone and Telegraph (ITT) of the U.S., which owns about one third of STC. System 12 is not at present made in the UK, though STC would probably arrange to produce it at its plant in North London if it won the Hull order.

The department is also understood to have held talks with Plessey and GEC, the two System X manufacturers, which are expected to enter bids. Foreign bidders may include Canada's Northern Telecom, France's CIT Alcatel and Sweden's L.M. Ericsson.

Hull is seeking loans from the European Investment Bank to help finance its network modernisation. The bank's rules require that contracts be put up for international tender. System X, which has cost about £300m, to develop so far, is intended

as the backbone of British Telecom's telephone network until well into the next century. GEC is also seeking to sell to India, and talks have also been held with China and several African countries.

Like other modern digital exchanges, it is based on microelectronic circuits and is designed to be much more efficient and versatile than the electro-mechanical analogue equipment which it is due to replace.

Hull is the only independent telephone service to have survived this century and prides itself on having scored a number of advances over its much larger rival.

It recently installed the first computerised directory inquiry system in Britain and pioneered the use of recorded music to soothe callers waiting to be connected to extensions at its headquarters. It also claims to have published the first UK telephone directory with a full-colour picture (of Humber Bridge) on its cover.

The System X battle, Page 14

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OVERSEAS NEWS

U.S. speeds arms deliveries to Thailand

BY KATHRYN DAVIES IN BANGKOK

THE U.S. is stepping up arms supplies to Thailand in the wake of the latest Vietnamese offensive against Kampuchean guerrillas, during which fighting spilled across Thailand's border with Kampuchea.

Two C-5 transport aircraft are due to arrive here today bringing extended-range howitzers and ammunition for the Thai army. A consignment at the weekend included Red-eye surface to air missiles, part of Thailand's \$200m (£133m) worth of arms purchases through the American foreign military sales programme.

President Ronald Reagan has asked Congress to approve an additional \$US.25m as a result of the border conflict.

Fighting in the area north of the Thai town of Aranyaprathet has died down, but Gen Prem Tinsulanonda the Thai Prime Minister, on a tour of the area on Saturday, said his country would take all possible defensive action to protect Thailand's territorial integrity.

At the newly created Tap Siem refugee camp, close to the Kampuchean border 100 people come every day to the Red Cross "training centre" to look for missing relatives.

The experience risks being macabre. Plastic bags containing the cremated remains of victims of last week's fighting, involving Thai, Kampuchean, and Vietnamese forces, are carefully labelled and left on a table for

public inspection. A shuffling procession of bewildered Kampuchean refugees finger the gruesome little packages.

According to the Thai authorities, the inhabitants of Tap Siem, squatting under makeshift tents in the scorching tropical heat are not refugees; they are Kampuchean civilians loyal to the Khmer Rouge element in the tripartite coalition forged last year to oust 180,000 Vietnamese troops from their country.

Like most Kampuchean camps along the border, the population is made up of both non-combatants and guerrillas. There are 50 young men of military age now to be seen in Tap Siem. Thailand has alleged that, in

Vietnam's latest drive against Kampuchean guerrillas, Vietnamese troops crossed into Thai territory and attacked Thai forces. Thai villages close to the border were also hit by Vietnamese shelling.

Foreign correspondents who had been denied access to the immediate border area for some months, were taken at the weekend to districts which the Thais alleged had come under Vietnamese bombardment.

No Thai civilians were killed in the attacks but five Thai soldiers died in direct fighting with Vietnamese troops. The Thais say they killed at least 250 Vietnamese soldiers

although only 12 bodies were recovered.

The next few weeks will be crucial for the anti-Vietnamese coalition and its allies, as the Vietnamese are expected to mount further offensives before the rainy season begins in June against two Kampuchean settlements: Nong Samet which accommodates 80,000 civilians and 1,700 guerrillas, and Ban Sangae with 20,000 civilians and 5,000 guerrillas. Both camps are controlled by the anti-communist leader, Son Sam, who has alleged that Vietnamese forces massacred Kampuchean women and children in last week's fighting. So far there is no independent confirmation of this allegation.

New bid to end Afghan conflict

By Anthony McDermott in Geneva

A NEW round of indirect talks in search of a political agreement to end the conflict in Afghanistan is due to start in Geneva today under the auspices of the United Nations.

They are to be attended by the Foreign Ministers of Afghanistan and Pakistan, but Iran has refused to take part. Sr. Diego Cordovez, the special representative of the UN Secretary-General, has expressed optimism that the talks, on the basis of previous discussions held here, in Moscow, Kabul, Islamabad and Tehran, have moved beyond procedural matters to issues of substance.

He also indicated that if progress is made, they could be extended beyond the April 22 deadline set.

This optimism would seem to be at odds with the public Soviet position on the conditions for the withdrawal of its 100,000-ore troops in the country, and with Iran's absence.

Iran, it seems, has been showing more interest than before in being informed about UN involvement in the negotiations. But it is refusing to attend as long as representatives of the Afghan resistance movements are not present and Soviet military occupation continues.

The talks here will not be direct. Instead, Sr. Cordovez will be acting as an intermediary between the parties negotiating the draft of a political agreement.

Four points, in particular, will be on the agenda: withdrawal of foreign troops from Afghanistan; non-interference of outside countries in that state's internal affairs; international guarantees against such interference; and in particular, means of enabling the voluntary return of Afghan refugees abroad.

A crucial point for the Soviet Union is the question of "interference" and the recognition of Mr. Babrak Karmal's Government, which both Pakistan and Iran have refused.

This latest series of talks will be the second held in Geneva since Sr. Javier Perea de Caceres, the UN Secretary-General, accompanied by Sr. Cordovez, visited Moscow in March.

Saudi officials seek to end speculation over budget policies

BY ROGER MATTHEWS IN RIYADH

SAUDI OFFICIALS sought to dampen speculation yesterday that the resignation last week of the governor of the Saudi Arabian Monetary Agency was related to the intense debate within the kingdom over the size of cuts to be announced in next Wednesday's budget.

The sharp decline in Saudi Arabia's oil income during the 1982-83 financial year, which ends on April 12, has forced ministers into difficult decisions over the extent to which foreign reserves should be drawn down in order to maintain the pace of the development programme.

Sheikh Abdel-Aziz al-Qurashi's nine-year tenure as governor of Sama — the kingdom's central banking and investment authority — has been marked by what one banker described as "a sensibly cautious and responsible management of the kingdom's assets."

Although the governor had previously expressed a desire to return to private business, his departure at this time has fuelled speculation that it could herald a shift towards policies more related to shorter-term political considerations.

Some Saudis believe that King Fahd will seek to avoid the unpopular domestic consequences of significant budget cuts by accepting a much larger deficit in the next financial year. This deficit would be covered by foreign reserves, while awaiting a revival in oil demand.

Even if the Government chose not to commit itself to a single new project during the coming financial year, the current development programme is already believed to require spending of at least \$400m.

The Government also has to face the prospects of supporting Iraq's war effort by some \$600-\$100m annually until Iran agrees to a peace treaty.

The appointment of a new governor at Sama is not expected for several weeks, but the front-runner is Mr. al-Sayari, who has been named acting head of the agency.

Senior executives of MCS are the Swiss concern Aluminuisse.

understood to have threatened to place more of 11,000 people employed in the industry on state subsidised layoffs unless the subsidy was granted.

Contrary to expectations, however, the meeting of economic Ministers, together with Sig. Amintore Fanfani, the Prime Minister, gave no public indication whether the restructuring plan will include the long-hoped-for participation by

The Government had projected oil revenues of some \$300m (£153.3m) during the current financial year, but latest estimates suggest it will have received less than \$650m.

Total revenue, including investment earnings, was supposed to have approximately balanced anticipated Government spending of nearly \$820m.

However, officials say that the budget deficit for the financial year now ending will be significantly less than these figures indicate, due to government under-spending.

With a further fall in oil revenue during the 1983-84 financial year apparently inevitable and with only limited scope for reducing commitments, it is accepted in Riyadh that the kingdom has no option but to realise more of its estimated \$1500m of reserves.

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Nasa confident after Challenger mission

By William Hall in New York

CHALLENGER, the second of four U.S. space shuttles which will eventually be flying to and from space every few weeks, landed at Edwards Air Force base in California on Saturday after a near faultless five-day maiden flight.

Work immediately began on preparing the space craft for its second flight in two months' time.

The U.S. space shuttle programme is running badly behind schedule as a result of technical delays, and Challenger's performance has boosted confidence of officials of the National Aeronautics and Space Administration (Nasa) that they can keep to their timetable, requiring four more shuttle missions before end of the year.

However, while Challenger itself performed well, the success of the main purpose of the trip—to launch the biggest and most advanced communications satellite in the world—is still in considerable doubt.

The 24-tonne tracking and data relay satellite (TDRS) was launched from Challenger on Tuesday but a Boeing rocket which was to push it into stationary orbit 22,300 miles above the equator failed, and the satellite is now badly out of position.

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Statoil drilling platform given loan clearance

By Hazel Duffy in London

AN \$84m Eurodollar loan package has been completed by Lazard Brothers and Christiana Bank covering 80 per cent of the financing of a drilling platform to be used by Statoil, the Norwegian state oil company.

The 10-year loan at floating rates is the largest foreign financing package for a vessel constructed in a Norwegian yard. The platform, the Ross Isle, was built by Kaldnes Verksted in Tonsberg.

The construction was financed by an Nkr 471m (\$65.7m) and loan guarantee facility, which was also managed and syndicated by Lazard.

The Eurodollar loan was completed in the face of considerable reluctance on the part of the banks to become further involved in the shipping and oil sectors.

Mr David Thomson, Lazard's director leading the negotiations, admits that he was "surprised at this reluctance," particularly given the status of the charterer, Statoil, which is taking the platform on an eight-year contract for drilling in Norwegian waters.

The co-managers of the floating rate facility, which has been arranged on behalf of a Norwegian limited partnership managed by A/S Rosshavet, are Manufacturers Hanover Trust and Chase Manhattan Bank.

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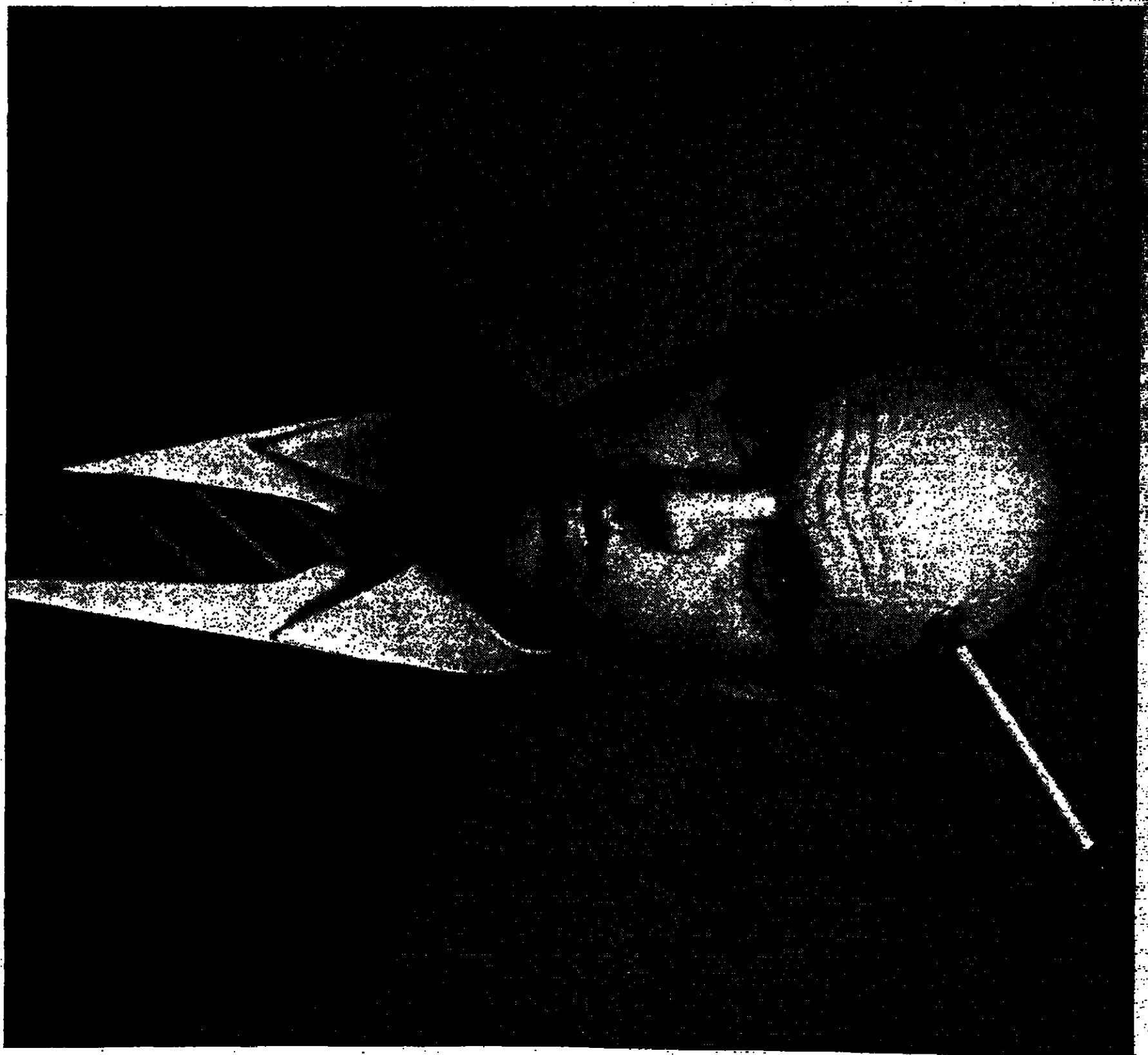
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OVERSEAS NEWS

INDIA'S TEXTILE INDUSTRY

No end of trouble at the mills

BY ANTHONY MOMETON, RECENTLY IN BOMBAY

MANY OF Bombay's textile mills have been paralysed for the past year by a strike which has highlighted a general malaise in the Indian textile industry, the largest in the non-Communist world.

The dispute—described by one senior civil servant as "the longest biggest strike the world has ever seen"—appears to be fizzling out. Workers are being sent back to work in increasing numbers or are being replaced by others.

But it has slashed Bombay's production of 24.3m kgs of cotton and blended yards were produced last year, compared with 140m kgs in 1981. Output of cloth fell even more severely, from 900m metres to 174m.

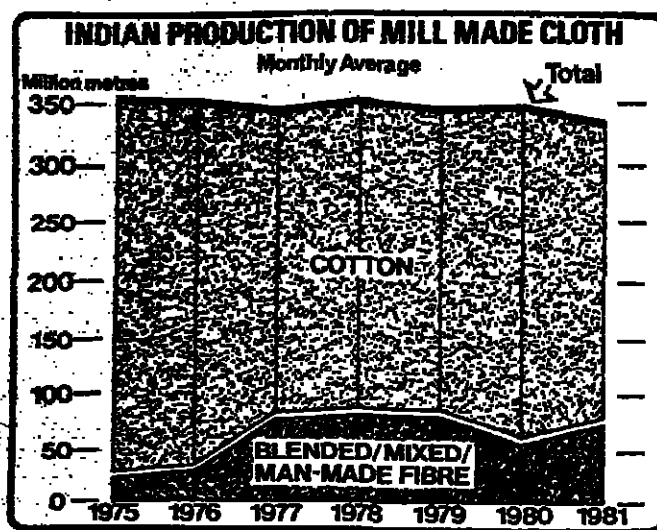
The dispute is essentially about money. Dr Datta Samant, leader of the workers, is calling for a £30 a month increase on the £50 earned by the lowest-paid workers.

The dispute has wider political ramifications. Dr Samant is already a member of the Maharashtra (or state) legislative assembly and has unsuccessfully stood for the Lok Sabha (or lower house) in New Delhi. Members of Mrs Indira Gandhi's ruling Congress party fear that if Dr Samant succeeds with the strike he will get a strong power base in the city from which to challenge them.

"The strike will not end until I win," he says. "I have seen the millworkers. I am their friend. They will not go back to work until I say so."

The Bombay Millowners' Association disputes this. It says that 115,000 of the city's 180,000 workforces are back at work, many of the mills are on three-shift production and output is up to 87 per cent of the pre-strike level.

Whoever wins, the strike is symptomatic of much deeper troubles in the industry. A World Bank report found it "in very poor shape by Western standards. There was no appreciation of the fact that often what they (Indian industry) regarded as efficient modern enterprises were in reality pitiful wrecks, hopelessly over-staffed and producing poor-quality goods at very high cost. The industry has fundamental problems: Government policy, which restricts the amount of new investment the private sector can undertake;



and the structure of the industry, with the Government acting to protect the inefficient state company, the National Textile Corporation.

Poor productivity and falling quality have hit exports particularly badly in recent years. Sales of cotton piecegoods fell from 600.35m sq metres in 1973 to 356.7m in 1980-81, the last year for which figures are available. Similarly, sales of cotton yarn dropped from a peak of 308.8m kgs in 1976-77 to 182.4m kgs last year.

The Bombay strike has contributed to this, since the 60 mills in the sprawling city account for two-thirds of India's exports.

India has the largest textile industry in the world after China. Something like 8m people spin and weave cloth and many more make up garments, spin silk, and produce carpets.

The country has 21.93m spindles and 210,000 looms. In Britain, by comparison, textiles accounts for some 311,000 jobs, some 1.5m spindles and 24,000 looms.

Indian production is grouped in three sectors: the composite mills (what the West would call vertically-integrated concerns); the powerloom sector; and the handloom (or village) sector. Each produces roughly the same amount of cloth each year though output per man is low in the powerloom sector and handloom output even lower.

The heaviest concentration of composite mills is to be found

in Bombay, where there are 60—12 in the rationalised National Textile Corporation, one in the Maharashtra Textile Corporation and the rest in the private sector. The other two principal textile centres are Ahmedabad, to the north of Bombay, and in Coimbatore, in southern Tamil Nadu.

Powerloom plants are to be found over much of India. They are mechanised but have little modern machinery and usually comprise companies with a capital of under £2m or fewer than 50 looms.

The industry's lack of investment stems from a government decree of 1952 that the then-existing number of looms—210,000 in the mills—could not be exceeded. The policy is designed to protect the village handloom industry. A company can put in a new loom, but only by scrapping an old one. "We have few modern Sulzers (the Swiss machine that is the industry's benchmark) in use," complains Mr Bhaskar Kakkar, adviser to the Cotton Textiles Export Promotion Council. "It's a terrible disadvantage."

Meanwhile, private manufacturers complain that the nationalised NTC is a drag on their performance. Mr Dhirubhai Ambani, chairman of Reliance Textile Industries, one of the fastest-growing concerns in Indian industry, says: "The nationalised group has no commitment to make profits and so goes on producing at less than cost. This government sees a nationalised sector as

one of its political objectives and tolerates the consequences.

"The inability to work profitably puts immense pressure on the profitable companies in the private sector by forcing them to match the ridiculous prices which the NTC charges. Their margins are depressed and they face a hopelessly difficult task competing."

The independent Bombay Textile Research Association has suggested that the industry needs capital investment of at least £1.5bn to be properly modernised. Since the mills cannot put up this sort of money themselves they have been to the Government seeking £117m to tide them over. The Government has yet to reply.

The need for modern plant is all the more important because of India's textile exports drive. In 1981 it had a big breakthrough with a major contract for the Soviet Union, which agreed to take 200m metres of cloth in both 1982 and 1983, with the possibility of more in subsequent years.

But the Bombay strike had a catastrophic effect on the deal. Shipments by the end of November totalled no more than 87m metres.

Soviet officials have said they will make up the difference this year and have talked of a total 275m metres in 1983. But there have been signs that Russia is less enthusiastic about the deal.

Bombay mill owners would like to move out of their cramped old factories and into modern premises near the cotton-growing areas.

Mr Sunil Khatau, executive director of Khatau Mills, employs over 6,000 on two sites, one at Byculla in the heart of the city, is over 100 years old. "The mills are just not generating sufficient profits to pay the higher wages Dr Samant wants," he says, "and the only answer is to move out."

"We are overcrowded and there are enormous problems over power supplies in Bombay. We have even bought land to move to. If we could open elsewhere we could produce our present output from a workforce of 2,500."

But the Maharashtra government—fearing serious job losses in Bombay—has forbidden any company to move out and it would need pressure from the union government in New Delhi to get the law changed.

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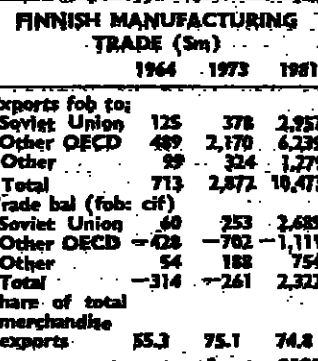
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China offers better terms for joint ventures

PEKING — China will offer longer holidays and greater opportunities to sell in China as part of efforts to encourage more foreign investors to set up joint ventures there.

Li Hao, deputy Secretary General of the State Economic Commission, told a news conference that outside its four special economic zones, China now has 48 joint ventures with foreign investment of \$102m and overall investment of \$222m.

"We hope the adoption of such measures will enable China to make greater strides in joint ventures," Li said. He conceded there had been a dampening of enthusiasm among foreign investors, and said some had shown "unnecessary worry."

China is clarifying its economic laws and regulations, and some foreign businessmen have held back to await laws they feel provide greater certainty.

Li said the new measures would exempt a joint venture from income tax for its first two years and require payment of only 50 per cent of the tax for the next three years. At present, the first year is exempt and half the tax must be paid for the next two years. Joint ventures now also must export enough to earn the foreign exchange needed to pay the foreign partner's foreign costs and profits. This limits the amount the ventures can sell on China's domestic markets.

Li said provision would be made to give them a bigger share of the domestic market, and not all ventures would be required to keep a balance in their foreign exchange earnings. He said machinery, equipment and other material bought abroad for a joint venture would be exempt from customs duties and China's industrial and commercial tax.

For goods and services bought on China's domestic market for a joint venture project, the ventures will be able to pay in Chinese currency and at Chinese domestic prices, Li said. Not having to pay foreign currency and export surplus for goods purchased locally would mean less pressure on joint ventures to export to earn foreign exchange.

Li said, however, that the ventures would have to pay international market prices for precious metals, oil and timber, although these could be in Chinese currency. Water, gas and electricity would be paid for in Chinese currency at domestic rates, he said.

AP

Italians win Venezuelan aircraft deal

By John Phillips in Rome

AERITALIA, Italy's leading aircraft manufacturer, announced yesterday that it has won a contract worth \$150m to supply eight military transport G222 aircraft to the Venezuelan Government.

Company officials said two of the aircraft will be used by the Venezuelan Army and six by the Air Force. The deal includes an agreement to provide spare parts and to train pilots and ground staff in Venezuela. Delivery is expected to commence this summer and is to be completed by the end of the year.

The deal underlines not only the high world-wide demand for the twin engine G222—83 of them have been sold so far to seven countries—but also the relatively robust shape of the state-owned Aeritalia, which last year increased its sales by an impressive 30 per cent. In January it sold five G222s to Nigeria for \$117m.

Anthony Robinson in Moscow reports on the Soviet approach to foreign trade

Falling oil price boosts Moscow's earnings

DESPITE sharply falling world prices for oil and gas, its major export items, the Soviet Union managed to cut its trade deficit with the industrialised West last year to a mere 100m roubles (\$12.45m), from 900m roubles in 1981, and 3.6bn roubles in 1979.

It did so by the simple expedient of consistently under-cutting the oil prices charged by the Organisation of Petroleum Exporting Countries (Opec) and thus raising the volume of its oil and product exports to the West by an estimated 40 per cent. At the same time it cut its own imports.

As a result Soviet exports to the West rose by 1.6bn roubles to 13.8bn roubles last year while imports rose only 800m roubles to 13.9bn roubles, reflecting a drop in real terms after inflation.

To find the extra volume of oil, the Soviets reduced oil deliveries to Eastern Europe by around 10 per cent and stepped up imports from countries like Libya, Iran and Iraq, mainly in exchange for arms.

The way in which it has boosted its hard currency earnings under such unpropitious circumstances reflects the way Soviet foreign trade enterprises behave.

Those controlling oil and gas, particularly, which earned nearly 80 per cent of total hard currency income from the West last year, are given hard currency targets and told to fulfil them, whatever the cost.

At the same time as it was boosting its hard currency earnings, a combination of increased arms sales and lower imports also secured a larger trade surplus with the developing world.

The Soviet Union portrays itself as the champion of the Third World and rails against the discrimination of capitalist states against the aspirations of the developing countries but its own trade pattern contradicts the propaganda.

Last year, for example, Soviet exports to the developing world rose 1.5bn roubles from 8.7bn roubles to 10.2bn roubles while its imports from the area dropped 1.1bn roubles to 8.7bn roubles. As a result, the Soviet Union raised its surplus on Third World trade from 900m to 3.5bn roubles.

A major factor in lower Third World imports was a virtual halving of grain imports from Argentina. The Soviet-Argentine trade volume dropped to 1.2bn roubles from 2.4m roubles in 1981.

On the other hand, trade turnover with Libya virtually tripled from 561m roubles to 1.55bn roubles. Libya has become the Soviet Union's second largest Third World trading partner, after India.

Libya, together with Syria, Iran and Iraq, India, Indochina and several African and Latin American countries, is a major customer of Soviet arms salesmen, who are believed to have sold nearly \$7bn worth of military equipment last year.

Arms sales are far and away the most successful and valuable sector of Soviet engineering exports, although the exact figures are carefully concealed.

In other fields, however, the Soviet Union has been markedly unsuccessful in boosting its engineering exports—especially in the competitive hard currency markets. Last year, engineering exports of all kinds, including civilian aircraft, nuclear power plants, power station equipment, transport equipment and machine tools accounted for only 8.1bn roubles of total Soviet exports of 63.2bn roubles. Of this total, some 73 per cent went to the virtually captive markets of Comecon, 23 per cent to other Socialist countries and only 4 per cent to the West.

Despite the higher proportion of engineering products in Soviet sales to Comecon, however, it is still principally a supplier of energy and raw materials to Comecon. Under the system of pricing oil which Comecon countries use, buyers have had to pay higher prices for the reduced volume of Soviet oil they received last year, at the same time as Soviet Union and all other producers were cutting their prices on the world market.

As a result, Soviet exports to Comecon rose 2.6bn roubles last year while Comecon countries, faced with recession in Western markets and burdened by heavy debts, stepped up their own exports to the Soviet Union by 4.1bn roubles. This reduced the Soviet trade surplus, effectively its subsidy to Comecon, to 3.7bn roubles, from 5bn roubles in 1981.

Moscow's lack of success in penetrating Western markets with engineering products is partly a reflection of the technological backwardness, poor reliability and reputation for bad service which Soviet engineering products have.

The resulting reliance on raw material and energy exports is somewhat embarrassing to the Soviet Union, but is likely to continue as large sectors of Soviet industry lag further behind the pace of technological change in the West.

Under the Soviet system, most enterprises or ministries have only a vague concept of the real costs of production due to the artificially-fixed pricing system. This means that the net resource cost to the Soviet Union of many of the products it exports is probably higher, in some cases far higher than the hard currency income it derives from them.

On the other hand, the cost to the Soviet Union of trying to produce many of the items it imports from the West would also be far higher than the cost of importing them.

This is reflected in one comment by a veteran British businessman: "Nobody ever sells anything to the Soviet Union—they make up their mind what they want in advance and get it." This is one reason why high technology sanctions against the Soviet Union are so difficult to enforce.

Anything the Soviet Union does not have the skills or equipment to make will be imported—whatever the cost and no matter how much needs to be paid to "fixers" to arrange the deal. It will still be cheaper and easier this way than trying to produce the items at home.

Foreign trade is playing an increasingly important role in the consumer goods area now, leaving aside the massive imports of grain, meat, butter and other foodstuffs. Many Third World countries, like India, produce much higher quality consumer goods and textiles than the Soviet Union.

The Soviet authorities have found one painless way to soak up the excess roubles swelling around the economy due to wage rises unmatched by increases in production: import consumer goods cheaply from the Third World and sell them at inflated prices on a domestic market starved of quality, colour and variety.

UK assembles £100m development aid for industry in India

BY JOHN ELLIOTT, RECENTLY IN NEW DELHI

FOUR PACKAGES of development aid, worth a total of over £100m are being assembled for specific industrial areas in India by the UK Government.

Both the power sector and railways have been allocated £30m each and £31m has been set aside for coal development. A fourth tranche of £18m is now under consideration for the country's rapidly expanding oil and offshore gas activities.

The aid will be paid against orders placed in the UK and the objective is to increase British exports to India by focusing the attention of Indian authorities and UK companies on specific areas.

The funds, which are all grants, will come out of the UK's regular bi-lateral aid budget, of about £100m a year, and are expected to be spent over the next two or three years.

They are separate from one-off allocations made for specific large projects such as a power station being built at Rihand by Northern Engineering Industries as a telecommunications contract for which the British System X is a contender.

A substantial extra allocation would also be made for the

Daitari steel works. The UK still hopes to receive orders worth £60m if this project goes ahead despite Davy McKee losing an overall £125bn turnkey contract for the whole steel works last year.

Most of the new packages of grants are expected to be spent on comparatively small orders. The railways aid is being targeted at breakdown trains, brake systems and marshalling yard equipment.

The coal grants—which constitute an extension of an existing aid arrangement—are aimed at orders for equipment such as walking drag lines, and fully automated long wall mining machinery.

In the power sector, the targets will include two gas turbines for a zinc project. The UK is relatively well established in these areas in India but it has made far less headway in the fourth sector—offshore oil and gas exploration and production.

Government ministers in London are concerned about the UK's performance in this area, and are planning a trade mission to India next winter in addition to the aid allocation.

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		UNEMPLOYMENT				
		Mar. '83	Feb. '83	Jan. '83	Mar. '82	
UK	000%	3,172.4	3,199.4	3,225.2	2,820.8	
	%	13.4	13.7	13.8	12.1	
U.S.	000%	11,881.8	11,489.0	11,446.8	9,881.0	
	%	10.3	10.4	10.4	9.0	
W. Germany	000%	2,535.8	2,487.1	2,223.3	1,935.2	
	%	7.6	7.4	6.4	7.3	
France	000%	2,080.1	2,129.9	2,131.4	2,003.8	
	%	9.2	9.4	9.4	8.8	
Italy	000%	2,702.2	2,690.2	2,585.4	2,315.5	
	%	12.0	11.9	11.4	10.3	
Netherlands	000%	778.7	774.1	764.5	597.7	
	%	14.5	14.3	14.3	11.2	
Belgium	000%	574.3	579.8	580.2	506.6	
	%	14.1	14.3	14.3	12.5	
Japan	000%	1,350.8	1,340.8	1,390.0	1,190.0	
	%	2.3	2.3	2.4	2.1	

Sources: Eurostat and others.

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PRIVATE SECTOR WILL SUPPLY RAILWAY EQUIPMENT

BR widens buying policy

BY HAZEL DUFFY, TRANSPORT CORRESPONDENT

BRITISH RAIL has introduced a new policy which will lead to the private sector supplying major equipment, such as locomotives for the first time in nearly 20 years. The policy has been devised following Government pressure on BR to give the private sector a better chance to compete, and also because the BR Board wants to push its subsidiary, BR Engineering, into becoming more internationally competitive in rail equipment at a time when long-term prospects for domestic work are poor.

The policy has been introduced while BR is still talking with the trade unions about proposals to cut the engineering workforce by 3,500 by the end of next year. In spite of the sensitivity of the BR engineering workshop closure proposals, BR recently placed two orders for a prototype medium-duty multiple unit (DMU) - one with BR Engineering at Derby, and the other with Metro-Cammell in Birmingham - which is expected to form the basis of BR's DMU reordering programme.

BR has also recently sent a specification to Brush (part of Hawker Siddeley) and GEC detailing its requirements for a new 125 mile per hour locomotive. The locomotive would be suitable for hauling trains on the East Coast main line. If this is electrified, BR has told the unions that it does not have the design capability at head office for the new locomotive, hence, its decision to go to the private sector. If the move results in orders being placed, they will be the first locomotives to be built outside BR since the late 1960s, with the exception of 30 freight locomotives built in Romania during the 1970s.

The BR board has made it clear to BR Engineering and the unions

that it will have to win more export orders, if it is to survive. BR Engineering has only competed for overseas work in the past two or three years as the decline in BR's own requirements had its effect on the workload. It has had some successes - most notably in the Congo recently - but the international market for rail equipment is extremely competitive.

If the closures of most of the workshops at Shildon, Co Durham, Horwich (near Bolton), and Temple Mills in East London go ahead, BR Engineering's workforce will be down to 31,000, of whom about half are employed on maintenance and the others on new build. This will still leave BR Engineering one of the largest engineering employers in the country. The whole relationship between BR and its engineering subsidiary was examined in the recently published Serpell Report on the UK rail system. Although BR Engineering operates at arm's length from BR, Serpell identifies several areas where the relationship needs sharpening. One possibility being considered by the Government is for parts of BR Engineering to be transferred to the private sector, but absorption back into the BR board is also being considered.

Steel industry will challenge flourishing scrap iron exporters

BY PETER BRUCE

THE rapidly expanding export business of Britain's scrap metal merchants is being challenged by the steel industry.

The British Steel Corporation (BSC) and the British Independent Steel Producers' Association are reported to be about to ask the European Commission to restrict exports of scrap to third countries.

Pressure to curb exports of British and other European ferrous scrap has followed a dramatic improvement in scrap prices. Prime scrap steel is selling for roughly £50 a tonne, compared with £25 a tonne last November.

The scrap industry, however, is unlikely to take an attack on its export trade lying down.

For instance, the reports of pressure from the steel industry coincide with plans by Coopers (Metals), the UK's biggest scrap exporter, to announce next week that it is merging its export business in the North East of England with a smaller operation, Robinson and Hanlon, a company run by the president of the British Scrap Federation.

Poor domestic demand for three

years has transformed Britain's scrap trade. Merchants have seen their numbers dwindle by more than 200, to between 400 and 500.

Four years ago Britain's ferrous scrap merchants could comfortably count on selling some 90 per cent of their iron and steel scrap in the UK. Because of the recession, about 50 per cent of UK scrap, worth £140m, was exported last year.

The industry's three main domestic customers - BSC, private steel-makers and the foundry industry - have been sharply trimmed during the recession.

These three groups last year bought roughly 1.5m tonnes of scrap each, with BSC, chiefly its special steels group, remaining the biggest single consumer.

BSC has all but lost the influence it had on scrap prices 10 years ago. Although there was a time, towards the end of last year, when scrap consumers managed to force the price of prime ferrous scrap down to about £35 a tonne, the merchants are now able to insist that BSC follows the improved European continental prices.

Survey reports serious skilled labour shortages

BY ALAN PIKE, INDUSTRIAL CORRESPONDENT

SKILLED LABOUR shortages continue to be reported by more than a quarter of employers despite high unemployment levels, according to a survey conducted by Manpower, the temporary services company.

Inquiries among 1,189 employers found 27 per cent reporting skill shortages, with industrial workers the most in demand.

The area which suffers most from skill shortages is the hotel and catering sector - accounting for 43 per cent of employers - where there is a large seasonal element in the demand for labour.

Other areas of substantial shortage include the clothing, textiles and electrical engineering sectors. The survey says that 32 per cent of local government departments also reported shortages of skilled labour, particularly in technical areas.

The sectors with fewest skill shortage problems were banking, insurance, food and drink manufacture and road haulage.

The regions with the greatest skill shortages were London and the North West, where 37 per cent of employers reported difficulties, and the East Midlands with 35 per cent.

One surprising result of the survey shows that, despite an acute youth unemployment problem, 40 per cent of the companies interviewed claim to be short of junior and trainee staff. Sectors reporting particular shortages of junior staff included banking, retailing, clothing manufacturing, vehicles and textiles.

A Manpower survey of employment prospects suggests that 21 per cent of employers expect to increase their staff by the end of June, compared with 13 per cent in the previous quarter and 14 per cent in the corresponding quarter last year. Staff decreases are forecast by 14 per cent.

The staffs of the English clearing banks started to grow again last year after a dip in 1981, prompting banks to attack as nonsense union claims that new technology is having a major impact on employment levels.

Figures from the Committee of London Clearing Bankers show that the staffs of Barclays, National Westminster, Lloyds, Midland, Williams and Glyn's and Coutts grew by 4,400 to 235,500. This compares with a drop of 6,500 in 1981, after 20 years of

growth which saw staff numbers double from their 110,000 level in 1960.

Banks argue that the 1981 figure was a hiccup to compensate for over-recruitment the year before, when existing staff began to hold on to their jobs in unexpected numbers because of the recession.

The long-term trend is continued slow growth, according to the banks. Some managers put the underlying staff growth rate at 1 to 2 per cent a year, compared with a 7 per cent growth in business. The gap is accounted for by increased efficiency, including new technology.

Mr Terry Molloy, deputy general secretary of the 150,000-member Banking Insurance and Finance Union (Bifu), accuses the banks of being unduly complacent about the impact of technology.

Staff numbers were still 2,000 below those of two years ago. He said: "I have no doubt at all that the reduction in the staffing levels was a result of new technology."

Bifu is seeking new technology agreements which give it substantial negotiating rights to influence the pace and manner in which new equipment is introduced.

Brokers optimistic about prospects for economic recovery

BY ROBIN PAULEY

THE APPARENT strength of the start of the British economic recovery, boosted by falling all prices, lower than expected inflation and a lower sterling exchange rate, has led economists at two leading brokers to be more optimistic about prospects for 1983.

James Capel now expects growth of 1.8 per cent during this year and a rise in activity of 2.7 per cent in 1984. "We now expect a more balanced and sustainable economic recovery over the next 18 months led by export and investment growth," they say.

Sterling's fall should be fully reflected in a 17 per cent improvement in UK competitiveness, the main impact on economic growth being felt in the last half of 1983 and first half of 1984.

Exports should begin to benefit from sterling's slide and a sharp recovery in world trade in the second half of this year. The sharp fall in sterling and consequent rise in import prices should also "choke off" import volumes and "penetration" in potential import penetration in 1984.

Capel-Care Myers says the inflation and sterling levels have been

instrumental in causing them to revise their growth forecast for 1983 from 1.5 per cent to 2 per cent. However, they are more pessimistic about 1984, for which they say there are grave dangers. If world growth proved strong then export growth could be enough to sustain the UK economy. "But it will need to be vigorous to achieve this. Otherwise, as consumer spending falters, the stock cycle could compound the difficulties, hence disappointing recovery hopes once again," they say.

● Prospects for industrial recovery in London and the South East have improved, with domestic and export orders and production levels all rising according to the London Chamber of Commerce and Industry.

The provisional results of its latest trend survey of manufacturing industry in London and the South East also highlight a substantial improvement in investment intentions throughout the region.

The rapid fall in the balance on current account, from a deficit of £1.5 billion in the third quarter of 1982 to a surplus of £1.5 billion in the third quarter of 1983, is higher than that reported in the July and September surveys.

GEC may buy back Welsh TV factory

BY ROBIN REEVES, WELSH CORRESPONDENT

GEC IS considering the possibility of buying back the South Wales television plant which it once owned but which, for the past four years, has been run as a joint venture with Hitachi of Japan.

News of the possible British repurchase emerged as 1,200 workers at the factory, at Hirwaun, near Aberdare, rejected a peace formula designed to cushion what amounts to a cut in pay. All production from the factory is expected to cease as a result of the dispute.

The local management is insisting on a wages freeze for the third year running and changes in a bonus plan which would reduce the pay of semi-skilled production workers from around £91 to £84 a week. It also wants to contract out the manufacture of certain components and factory services.

Discussions on GEC's possible buyout of Hitachi's 50 per cent share in the company are understood to be due to take place this week. GEC has declined to com-

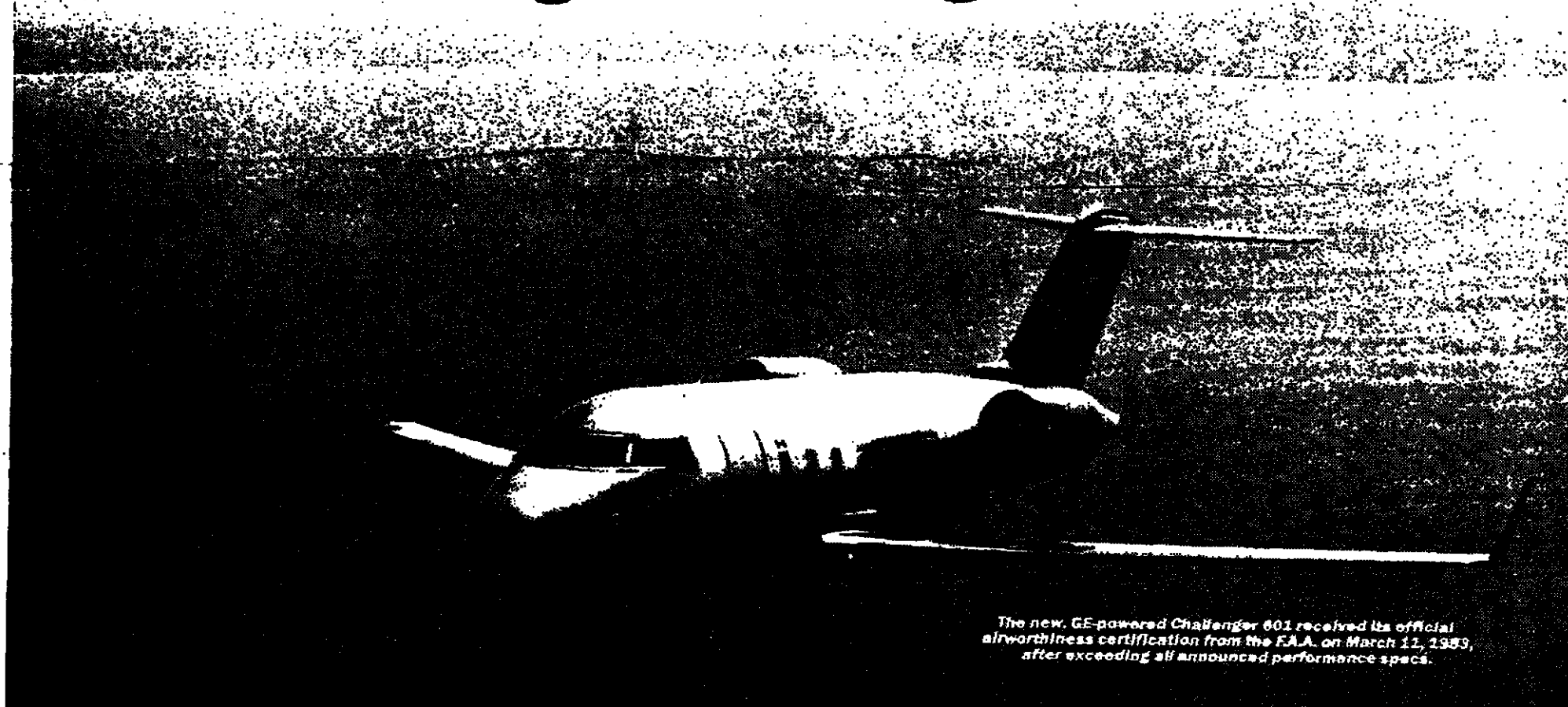
ment, saying only that it held regular meetings with Hitachi about the jointly owned business.

GEC-Hitachi is the only surviving Anglo-Japanese joint venture in television manufacture. A comparable arrangement between Rank and Toshiba was wound up two years ago and the assets were subsequently taken over by Toshiba alone.

GEC's practical involvement in the day to day running of the Hirwaun plant has been strengthened within the past two months by the appointment of Mr Graham Williams of GEC as managing director, in place of Mr S. Okuma of Hitachi.

Last year the plant was forced on to short time working for a period and then announced more than 800 redundancies as part of a package of measures aimed at cutting production costs by 25 per cent. The plant has the capacity to produce 250,000 to 300,000 colour TV sets a year.

Canadair is proud to announce the realization of its competitors' greatest fears. Introducing the Challenger 601.



The new, GE-powered Challenger 601 received its official airworthiness certification from the FAA on March 11, 1983, after exceeding all announced performance specs.

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And while such a feat has only recently become technologically feasible, you might say it was historically inevitable.

The Challenger, after all, was conceived, designed and built from scratch in the late nineteen-seventies.

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To find out more about the historically imperative Challenger 601, the man to speak to is Mr. James B. Taylor, President of Canadair Inc.

His telephone number is (203) 226-1581.

Or you can write him at Canadair Inc., 274 Riverside Avenue, Westport, CT 06880.

In the Mideast, TAG Aeronautics Ltd. is the exclusive distributor and representative for Challenger sales and support.

For further information, contact Adel A. Oubari, Vice President, TAG Aeronautics Ltd., 14 Rue Charles Bonnet, 1211 Geneva 12, Switzerland. Phone: (022) 46 17 17. Telex: 289 084.

canadair challenger

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All documents for registration and correspondence should in future be sent to the address below.

J.R. DRYSDALE F.C.I.S. SECRETARY



Lloyds Bank Plc, Registrar's Department, Goring-by-Sea,

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Lloyds Bank Plc

UK NEWS

Three cases of derailed legislation

BY A. H. HERMANN, Legal Correspondent

IF YOU are thinking of confining your files to the memory of a computer or word processor, stop and consider the implications of the Data Protection Bill which is likely to receive its second reading in the House of Commons shortly.

Passed in its present form and interpreted strictly, this piece of legislation would oblige you to disclose to those concerned whatever was in your computer's memory. You would have to register, and the Registrar, to be appointed for controlling the operation of the Act, would have the power to withdraw the registration without notice, and impose unspecified fines on you. If an error slipped into your electronic memory, you would be liable for damages to any person who suffered by it, even if you were in no way to blame, but you would not be so liable had the error remained recorded in black and white on your files.

This, as well as other horrors, emerges from an article by Clive Rumbelow, solicitor and chairman of the International Bar Association's committee on computer law. If the consequences of the proposed legislation are only half as bad as Mr Rumbelow assumes, it ought to be quickly returned for re-drafting.

The legislation is designed to enable the Government to ratify the "European Convention For The Protection of Individuals With Regard To The Automatic Processing Of Personal Data." It is very doubtful that the European Convention was intended to apply to ordinary business processing of information, right down to newsgatherers' addresses of customers, solicitors' files, medical records, and servicing of domestic appliances, such as central heating and television sets. Unfortunately, the text of the Bill, in combination with the liberal method of interpretation, is likely to have such effect.

Mr Rumbelow suggests that this unfortunate piece of legislation could be saved by deleting from it Part II which deals with registration. Unless the

Convention can be altered, the Government is committed to a very wide definition of "personal data" which would make registration extensive and onerous. Almost every business and organisation could be a personal data user, and yellow pages would be a better and less costly starting point for the Registrar.

On the other hand, the Convention does not require the introduction of a registration system. "With the registration provisions could also go all powers of the Registrar to put people out of business," writes Mr Rumbelow, and proposes that enforcement of data protection should be left to the courts in the ordinary way. The correction of inaccurate personal data could be obtained in the same way as was staked out

The Government pushes the Data Protection Bill too far and a trademark for services too little, while it puts equal pay into reverse gear

in the Consumer Credit Act with regard to credit reference agencies.

While the Government displays a somewhat excessive zeal over data protection legislation, it seems to be entirely lacking any enthusiasm for a short but most necessary Bill which would extend the use of trademarks to services. The Bill, piloted through the House of Lords by Lord Campbell of Alloway, was introduced in the House of Commons by Mr Stephen Dorrell and is listed for a second reading on May 20. In the Lords it received support from all sides, but not from the Government, so the fate of the second reading remains uncertain.

Trademarks for services can be registered in many European countries, and are also provided for in the proposed Community trademark regulation. The extension of British trademark law to services was recom-

mended by a departmental committee in 1973. The need was also recognised by the House of Lords Select Committee on the European Communities when it considered the Community trademark.

Presenting the report of this Committee to the House, Lord Scarman said that the lack of provision for service trademarks was "a very serious omission in our law." The Government now argues that amendments which it hopes to achieve in the Community trademark proposals will be enough to remove this UK disadvantage, but the main reason seems to be that the Trademarks Registry cannot cope with applications, even without service trademarks.

Without the possibility of registering a trademark, service enterprises can protect their

names only by the common law means of a passing-off action, which is difficult, expensive and time-consuming. Small businesses can hardly afford such a costly move, and it is not available to new businesses at all. This makes the negative attitude of a Government, which is supposedly friendly to small and new enterprises, difficult to comprehend, particularly as the Trademarks Registry is a profitable operation and could easily be expanded by the hiring of temporary staff.

I know a very successful female journalist who started as a tea-girl, but in Germany where there is only one trade union for each industry, British trade union barriers make redeployment of workers difficult, and the best utilisation of talent impossible.

Legislation which would give women a claim to equal pay with men doing work of equal value would not entirely

remove the disadvantage (to women and to society) but would help. Yet legislation introduced by the Government to comply with a European Court judgment leaves one wondering whether it is not designed to defeat, rather than to promote the principle of equal pay for work of equal value.

The legislation takes the form of an Order under the European Communities Act 1972 instead of the expected Amendment to the Equal Pay Act 1970. In this way, the Government will avoid amendments and consideration of the Bill in committee. Debate in the House of Commons will be restricted to 90 minutes.

Yet, if I read the draft orders correctly (and this is by no means easy), it is badly in need of amendment to achieve its purpose. It excludes claims from work places which have a job evaluation scheme, no matter how old or sex-biased. When the claim may be brought the industrial tribunal can reject it out of hand because it thinks it unreasonable. But it can allow the claim only on the basis of the report of an expert. Moreover, sex discrimination has to be proved by the applicant—an impossible task in most cases. Those who still dare to go ahead may be warned by the tribunal that certain costs may be awarded against them. To make things still more difficult, those who start with the argument that they do the same or similar work as a man who is better paid and fall in their claim, will not be able to continue with the subsidiary argument that, if not similar, their work is at least of equal value.

Do not blame the parliamentary draftsmen. Women face a much more powerful conspiracy.

The Law Society Gazette, March 2 1983, p.32.
NSM 10 10 42183 7, November 16 1982.
SECC Commission v UK, Case 51/81, judgment July 8 1982, FT July 15 1982.
FT July 15 1982.
57th Equal Pay (Amendment) Regulations 1983 laid before Parliament in draft.

Freeports 'will be no overnight success'

By Anthony Moreton

THE LOCATION of Britain's first freeports should be dictated by commercial considerations rather than political factors, Mr Ken O'Brien, chief executive of Rush and Tompkins, told a London conference.

The Chancellor of the Exchequer gave the go-ahead for the establishment of the first British freeports in last month's budget statement.

The locations of several freeports—small secured areas, treated as being outside the customs frontiers of the host country, where goods can be temporarily stored, manufactured or processed free of customs duty—are expected to be named by the Government later this year.

Mr O'Brien told the conference, organised by the Adam Smith Institute, that it would be wrong to expect immediate success for freeports. It had taken 50 years to get the experiment right in the U.S., and Britain should not expect to see overnight success.

Another important factor was convenience. "Don't be blinded by tariffs. Make it easy for people to use freeports and the chances of success will be enhanced."

Rush & Tompkins is one of the few British companies with practical experience of how freeports operate in the U.S. The company holds a 46 per cent stake and manages the Delaware Valley Foreign Trade Zone in Philadelphia.

Dr. Madsen Pirie of the Institute, welcomed the Chancellor's decision since "freeports are areas of freedom where untethered enterprise shows what can be done without government regulation."

WE HAVE TRIED TO BE FAIR, SAYS PENTAGON

British prospects bleak in the struggle for Trident contracts

BY BRIDGET BLOOM, DEFENCE CORRESPONDENT

WHEN the Government announced a year ago that Britain would spend £7bn to £11bn on buying the U.S. Trident missile system as the UK's next generation nuclear deterrent, it tried to sweeten the controversial deal by offering British companies the chance to compete for contracts in the much larger U.S. Trident missile programme.

Officials were then and still are unwilling to put figures on what could be at stake. About 45 per cent of the £7.5bn Britain is scheduled to spend (at 1981 prices) on Trident will be in dollars. The ultimate size of the U.S. programme is not yet determined but, with some 20 submarines each carrying 24 missiles against Britain's planned four boats with a probable 16 missiles each, the U.S. programme is obviously much bigger than Britain's.

Thus, there will be very substantial business for defence industries. But what share might come to Britain? In a few months' time a preliminary answer can be given.

For if, by the summer, British companies have not been accepted as potential sub-contractors by the seven main U.S. prime contractors (long since appointed) then officials on both sides of the Atlantic agree they will stand no chance of getting contracts once the Trident programme enters full scale engineering development at the turn of the year.

"We've moved heaven and earth to make sure British companies can compete on an equal basis," a senior Pentagon official said in an interview in Washington last month. "Now it's up to them."

An official in the special Trident office in the Ministry of Defence in London emphasises the special measures which have been taken

over the last year to encourage British companies to compete for business.

These measures began with a briefing in London by Pentagon officials at the height of the Falklands war last May. Several U.S. contractors, including Lockheed, Sperry and Rockwell have also briefed companies in the UK. Bureaucracy has been reduced to allow more than 70 companies to visit the U.S., and regulations waived to make it easier for British companies to meet stringent U.S. procedures for registration with American prime contractors.

Mr Robin Heiser, who runs the small Trident office in the Ministry of Defence, said 153 British companies were qualified, or possibly soon would be, to compete for U.S. sub-contracts. But that is a preliminary—if essential—stage to winning bigger business.

Ministry and Pentagon officials praise the joint agreement on Trident, but they cannot hide that it is strictly limited. It is not an "offset" deal, unlike in the 1960s when British companies were guaranteed some \$700m of business in return for British aircraft purchases from the U.S.

This time there is no guarantee of any major business coming Britain's way and the Government has been criticised by industry for not achieving anything more than a U.S. agreement to spend £150m to buy British Aerospace's Rapier missile to defend U.S. airbases in Britain.

Britain is buying between 70-100 Trident II (or D5) missiles and their associated control and guidance systems from the U.S. The deal is, therefore, simply that British companies can "compete on the same

terms as U.S. companies for sub-contracts for the Trident II weapon system and components for the programme as a whole."

The competition does not extend to the submarines from which the missiles will be fired.

How do British companies rate their chances of winning business? Very dimly according to a straw poll this week of senior executives of both small and larger companies.

Three key problems highlighted by Mr David Gilbert, managing director of Hunting Engineering, were echoed by others in the industry.

● The Trident II programme, based on the existing Trident I programme, is sufficiently advanced for most sub-contractors to have been effectively designated already.

● Competition for remaining contracts is such that only companies with very special skills or products have a chance of competing.

● That chances will be enhanced if the company is already well known to a U.S. prime contractor.

Few executives are hopeful. Many are downright pessimistic. "I don't think there's a hope in hell of getting anything worthwhile," said the marketing director of the high technology communications company.

So far there is little to show for the agreement. The only contract directly attributed by the Ministry to the Trident deal is worth some £4,000. Stealing Metals have supplied an aluminium investment casting for testing in the gyro for the missile's guidance system. Mr Heiser at the Ministry and the company both hope, however, that this will be "the thin end of the wedge."

How Baxters stirs the soup on the banks of the River Spey

Mark Meredith reports on the making and marketing of a better class of groceries

DECISIONS THAT have stirred the soup market in Britain have often been made in a hut on the banks of the River Spey in north-east Scotland.

During a break in a day's salmon fishing on this preserve of the wealthy, Mr Gordon Baxter will adjourn to the hut of his forefathers' or "baxter" or "relaxed" negotiations over a dram of single malt about bulk orders for canned cream of smoked trout soup, tinned sardines, or perhaps vintage marmalade.

To disarm the world-weary trader, leaping salmon, venison, grouse, country cooking, fresh air, Scotland and things healthy become positive assets when sold by the genial 65-year-old, a prominent member of the village Episcopal church and grandson of the local grocer.

Baxters of Speyside trade success on being the antithesis of the anonymous big city corporation.

In spite of more than 100 takeover offers, fast growth, a £15m turnover and profits this year of about £1m, Baxters remains very much a private company.

Preserving family history in spite of the best American style, grandfather George Baxter's grocery shop has been reconstructed in the factory grounds near Fochabers in Grampian.

Baxters has secured and is improving on a 5 per cent share of the UK soup market at a time when the British consume less soup.

Two ranges of soups, one at the upper end of the general consumer market and another at the top of the "special occasion" soups market such as pheasant consommé and

products leaving open the top end of the market.

Fresh and frozen goods are making inroads on long life foods like those in cans. But restaurant business is suffering. More people stay at home to eat and there is a glut of food in the kitchen.

From the hygienic freezing rooms about 40 new products have been approved in the past for the M.S.L. probe the market, home and the European meal at "TWA" today are "hotel cream of smoked trout on the way out and cream of asparagus on the way back," Mr Baxter notes.

Today's soups, sauces or jams are tested regularly against the market health agreed on by his tasting Panel. Tasters move into small cubicles to ensure objectivity.

Baxters was recently split up with two separate subsidiaries to market game pies to the £2bn a year pub food trade and "The Best of Scotland" a pilot plan to distribute breakfast table-size pots of jams and marmalades for the catering trade.

What is not discussed much at Baxters is the inevitable problem with big family companies—succession.

Mr Gordon Baxter's eldest son, Andrew, 25, works in the company but is not a director. Mr Baxter himself maintains an active interest, and the day-to-day running of the company is carried out by Baxters of Speyside under Mr Jamieson. Non-executive directors on the board such as Sir Jan Lewando, formerly export director of Marks and Spencer, have a watching brief to ensure the family character of the company stays.

Producers adjusting to consumers with less disposable income have moved down-market into generics and lower

products leaving open the top end of the market.

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Associates Corp	11 %	Knowles & Co. Ltd.	11 %
Banco de Bilbao	10 1/2%	Lloyds Bank	10 1/2%
Bank Hapoalim BM	10 1/2%	Mallinhal Limited	10 1/2%
BCCI	10 1/2%	Edward Manson & Co.	11 1/2%
Bank of Ireland	10 1/2%	Midland Bank	10 1/2%
Bank Leont (UK) plc	10 1/2%	Morgan Grenfell	10 1/2%
Bank of Cyprus	10 1/2%	National Westminster	10 1/2%
Bank Street Sec. Ltd.	10 1/2%	Norwich Gen. Tst.	10 1/2%
Banque Beige Ltd.	10 1/2%	P. S. Refson & Co.	10 1/2%
Banque du Rhone	11 1/2%	Roxburgh Guarantees	11 %
Barclays Bank	10 1/2%	Royal Trust Co. Canada	10 1/2%
Beneficial Trust Ltd.	11 1/2%	Slater & Gordon	10 1/2%
Bremar Holdings Ltd.	11 1/2%	Standard Chartered	10 1/2%
Brit. Bank of Mid. East	10 1/2%	Trade Dev. Bank	10 1/2%
Brown Shipley	10 1/2%	Trustee Savings Bank	10 1/2%
Canada Farn's Trust	11 %	TCS	10 1/2%
Castle Court Trust Ltd.	11 %	United Bank of Kuwait	10 1/2%
Cayzer Ltd.	10 1/2%	Volkswagen Intl. Ltd.	10 1/2%
Cedar Foldings	11 %	Westpac Banking Corp.	10 1/2%
Charterhouse Japhet	10 1/2%	Westway Leidlau	11 %
Choulatons	11 1/2%	Williams & Glyn's	10 1/2%
Citibank Savers	11 1/2%	Wintrust Sec. Ltd.	10 1/2%
Citizens Bank	10 1/2%	Yorkshire Bank	10 1/2%
C. E. Coates	11 %		
Comm. Bk. of N. East	10 1/2%		
Consolidated Credits	10 1/2%		
Co-operative Bank	10 1/2%		
The Cyprus Popular Bk.	10 1/2%		
Thurston Lawrie	10 1/2%		
E. T. Trust	11 %		
Ester Trust Ltd.	11 1/2%		
First Nat. Fin. Corp.	12 %		
First Nat. Secs. Ltd.	13 %		
Robert Fraser	11 1/2%		
Grindlays Bank	11 1/2%		

APPOINTMENTS

Barclays designates treasurer

Mr Ronald Ball, at present deputy treasurer, has been appointed treasurer of BARCLAYS BANK from July 11. Mr John Burnside, at present assistant local director for Barclay's Preston district, has been appointed assistant general manager of the bank's group property division from April 15.

Mr J.A. Griffiths has been appointed to the board of INITIAL, in the newly created position of finance director. He was group controller.

Mr Graham Wilson has been appointed managing director of LEACH LEISURE, part of the William Leach Group. He was general manager.

Miss Janet E. Watson has been appointed vice-president, Eurobond sales, by SALOMON BROTHERS INTERNATIONAL in London. She was formerly with the London office of Credit Suisse First Boston.

Mr John Raddcliffe has been appointed chief financial officer, worldwide retailing (ex. U.S. and Africa) by JARDINE INSURANCE BROKERS. He was in the financial services division of Great Universal Stores.

Mr John Earl has been appointed managing director of HADEN DRY-SYS INTERNATIONAL, industrial fishing and mechanical handling division of Haden. He joins from Lunnans, where he was director of operations.

Mr Gordon Hamler, chairman of HILLARDS will retire from the board at the annual meeting in September when he will have reached the age of 70. Mr Peter Hartley, managing director, will become executive chairman, and Mr Bob Dawds, retail director will be appointed managing director.

Mr Colin Wyman has been appointed to the board of CHAMBERLAIN PHIPPS as finance director. Previously the company's investment manager, Mr Wyman takes over from Mr Brian Chamberlain who continues as chief executive.

Mr Christopher A. Bloomfield, Mr Robin C. Holliday and Mr Robert L. John have been appointed to the board of COUNTY BANK.

Four new partners are joining GRIVELSON GRANT AND CO, stockbrokers. They are Mr Ashley-Benn, Mr V. G. D. Halse, Mr M. A. Harman, Mr R. Halsey and Mr P. B. Sanders. Mr G.H. Wilson and Mr E. Beckhurst are retiring.

Mr Donald Bevan, chairman of Midland Bank, has been appointed chairman of THE CITY COMMUNICATIONS CENTRE, an information and liaison unit set up by City institutions in 1978. He succeeds Mr Timothy Bevan, chairman of Barclay's bank, who has relinquished his post with the centre following his recent appointment as chairman of the Committee of London Clearing Bankers.

Mr Gordon Peake has joined REDEFINITION COMPUTERS as board technology director. He was with Computervision as support manager for Europe, and has worked with ICL, IBM and Honeywell.

Mr Ron Dearing, chairman of the Post Office, has been elected to serve as group chairman of the NATIONALISED INDUSTRIES CHAIRMAN'S GROUP for 1983-84.

Mr Norman Payne, chairman of the British Airports Authority, who was group chairman of NCG for 1982-83, becomes past chairman for the coming year.

Mr David Waino, BBC regional television manager, south west (Plymouth) has been appointed head of BBC network production centre, Pebble Mill, from May 31.

Mr Richard Ouston has been appointed to the new post of commercial director of VIKING POLYPROPYLENE, subsidiary of the Seven Holdings Group. He was sales administration manager.

From March 31 Mr P. Langley-Essen, general manager of the NEWCASTLE BUILDING SOCIETY, will become chief general manager. He has been chief executive since the formation of the society in July 1980, following the merger of the Grainger and Newcastle Permanent Building Societies. Mr E. A. Cowan, currently deputy general manager, will become assistant manager.

Mr D.W. Midgley, currently assistant manager (development), will become deputy general manager. Mr I.B. Cowan, currently general manager, Mr E. Garraon continues as secretary.

From July 1 Mr Rex M. Fleet, chairman and managing director of NCR UK, will be appointed vice president, financial systems division of the U.S. marketing organisation, and will be based in Dayton, Ohio. Succeeding him will be Mr Frederick Newall, who will be appointed chairman and managing director of NCR UK. Since August 1982 he has been executive assistant to the chairman and president of NCR Corp. in Dayton.

Mr David C. Samworth has been appointed a non-executive director of the IMPERIAL GROUP. He is currently chairman of the Meat and Livestock Commission.

Mr Peter Simons has joined the board of THE MORGAN CRUCIBLE Co. He is chairman of Hudson.

Mr Ronald N. Waxman has been appointed finance director of BLACK ARROW GROUP. He continues as company secretary.

Mr John S. Roban has resigned as chairman of ROHAN GROUP. He moves to Los Angeles to establish Roban California Investments Inc., of which he has been appointed chief executive. He will become vice-chairman of Roban Group and Mr Kenneth C. Roban will become chairman and continue as chief executive.

Mr David J. Smith has been appointed to the board of ATIKEN HUME. Mr Smith has, until recently, been based in Washington DC, where he was with IPC, the private sector arm of the World Bank. Before that, he was a manager and senior banking executive with Lazard Brothers and Co.

Mr A.M.A. Parker, Mr N.H. Bubb, Mr C.J. Ring, Mr L.C. Buckley and Mr N.P. Chamberlaine will be joining the partnership of SCRIMGEOUR, KEMP-GEE AND CO, stockbrokers, on April 11.

WOOLWICH EQUITABLE BUILDING SOCIETY has made the following appointments: Two general managers, Mr David Small (corporate planning) and Mr Michael Tuke (finance), have been appointed. Mr W. E. Clarke, general manager (finance), becomes general manager (administration). Assistant general manager, Mr A. I. S. McKiddie succeeds Mr Tuke as secretary and the society's chief internal auditor, Mr Stanley Cummings, has been appointed an assistant general manager. Mr Peter Beeke has his post extended and is re-appointed assistant general manager (management services).

Mr H. R. Scudliffe, NORWICH UNION INSURANCE GROUP's general manager and secretary, is taking over as general manager and secretary of the Norwich Union Life Insurance Society from July 1. He replaces Mr V. W. Hargill who will be concentrating on his duties as deputy chief general manager of the Norwich Union Insurance Group. Mr D. P. Lister, assistant general manager (data processing) becomes general manager and secretary, Norwich Union Insurance Group. Mr A. Bridge-water, assistant general manager (staff), is to be deputy general manager of the Norwich Union Fire Insurance Society from July 1. Mr A. G. Mills, underwriting manager (life), is to be

assistant general manager (data processing) from July 1, and Mr P. O. Sheridan, home fire manager, is to be assistant general manager (staff). Mr E. J. Bristle, the group's planning manager, is to be underwriting manager (life), and Mr R. A. Cobb, assistant home fire manager, is to be home fire manager from July 1.

Mr Ross Wheeler has been appointed director and general manager of the RADIO RENTALS cable operation and Mr Stanley Bell has been appointed technical director from April 1. Mr Wheeler was regional controller west region. Mr Bell has been associated with the cable operations of Radio Rentals, particularly in Swindon and the Midway Towns. Mr Michael Thomas, area manager, Yorkshire, has been promoted to regional controller in succession to Mr Wheeler.

STEAD & SIMPSON has made Mr W. R. F. Chamberlain a non-executive director from April 1. Since 1972 Mr Chamberlain has been chairman of Chamberlain Phipps.

Mr G. E. Parker has been co-opted to the board of CROWN HOUSE. Mr Parker is managing director of the engineering contracting division of the Crown House Group. Subject to his election at the annual meeting, Mr Parker will be appointed group chief executive on October 10. On July 1 Mr E. C. Boys will be appointed managing director (formerly north region director) of Crown House Engineering Limited and Mr A. F. Eyre will be appointed managing director (formerly deputy managing director) of

Crown House Engineering International. Mr Parker will remain on the boards of both these companies.

DAVIES & NEWMAN has appointed three directors: Mr James S. Farrell, manager of the Shellhaven tanker agency, Mr John M. Dwyane and Mr David L. Blight, tanker chartering brokers.

FIELDING & PARTNERS (AVIATION) has appointed Mr R. W. Fielding, Mr A. J. Money, Mr P. J. Stephens and Mr R. C. Weston as directors of the newly formed company.

Mr Christopher Wilson, chairman and managing director of NORTHERN COUNTIES NEWS-PAPERS, whose retirement becomes effective April 1984, is to relinquish his position of managing director. Mr Tony Boore, managing director designate, becomes managing director of NCN, on April 1. Mr Wilson is to continue as chairman.

THE STIRLING BROKERS ASSOCIATION has appointed the following officers: Mr M. J. Warren, of M. W. Marshall (Sterling), chairman; Mr M. G. Redgwell, of Butler Till deputy chairman; Mr N. R. Blows, of Harlow Meyer Savage, secretary and Mrs A. M. P. Howarth, of Packshaw and Co., treasurer.

Dr Ash O'Donoghue has been appointed director of ICL's consultancy and training services division in addition to his present duties as director of the DNK division.

Mr Keith R. Greenwell has become managing director of the WORCESTER ROYAL PORCELAIN CO. Mr Greenwell has been involved with the Royal

Worcester Spode Group as a management consultant for five years.

Mr John D. Castleman has been appointed chairman of TOWN AND COUNTY BUILDING SOCIETY in succession to Mr Eric Price Holmes, who has retired. Mr Castleman has been a deputy chairman of the society. Mr F. V. Dale and Mr Reginald Woolgar have been appointed joint deputy chairmen.

Dr Stuart L. Ralsky has been named manager of management planning and development in the corporate relations department of PPG INDUSTRIES. He had been manager of training and organisation development for chemicals operations.

WYLY CORPORATION has appointed Mr Gregory J. Liemandt chairman and chief executive officer of the corporation and its wholly-owned subsidiary University Computing Company from April 1. Mr Liemandt was chairman and president of General Electric Information Services Company (GRISCO) where he held a number of senior management positions from 1974 until his appointment as chairman in 1980.

Mr Donald O. Neddenriep has been appointed group vice-president of the product division of the computer system operation of SPERRY CORPORATION. Mr Neddenriep, vice-president and general manager of software products, takes over from Mr Paul J. Spillane, who is vice-president for manufacturing and technology

Mr Ladislav von Hoffman has been appointed a director of MINORCO. He is president and chief executive officer of Consolidated Mining and Industries (Consolidated), the central holding company of the Hochschild Group. Consolidated holds 60 per cent of Minorco indirectly 10 per cent of Empresas Sudamericanas Consolidadas, an investment holding company with extensive interests in South America.

The CHICAGO BOARD OF TRADE has approved the promotion of Mr Frederick J. Grade to vice-president/secretary of the exchange, and Mr Delbert Heath, Jr. to vice-president/administrator of the Office of Investigations and Audits (OIA).

Among his other duties Mr Grade will serve as staff liaison to the board and the executive committee and to other member committees. Mr Heath will oversee the financial integrity of exchange members and assure member compliance with exchange rules and regulations.

U.S. Comptroller of the Currency has selected Mr H. Joe Selby as senior deputy controller for bank supervision. Mr Selby had previously been senior deputy controller for national operations. Mr Selby will be responsible for establishing all bank supervisory policies and practices, as well as policies affecting national banks requiring special supervisory attention. Mr Selby will continue to serve as a major member of the Policy Group, which advises the comptroller on major policy decisions.

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CONTRACTS AND TENDERS

GREATER MANCHESTER COUNTY COUNCIL

Oil from Cellulose Project - Commercial Exploitation

1. The GMC, in association with Salford University Industrial Centre and the Manchester Institute of Science and Technology have jointly developed and patented a process to produce oil from waste materials containing cellulose. The process (which is patented) involves high temperature and pressure hydrogenation of treated slurry in the presence of solvents and a catalyst.

2. A conversion time of minutes has been achieved in the experimental 30 litre system. The oil product is approximately equivalent to North Sea, but with low sulphur and nitrogen content. The process could also be applied to agricultural waste.

3. Applications are invited from organisations wishing to participate in the commercial exploitation of the process. These applications are to be sent in a plain envelope, addressed to the County Legal Officer (Reference P2/83) at the County Council, 100, Piccadilly, Manchester M60 2HT. The envelope must not bear any markings which could identify the name of the applicant. The closing date for applications is 12 noon on 13th May, 1983.

4. The applicants referred to will be notified by this date 1983 and given a full brief. They will be asked to submit proposals incorporating the following points:

(1) The additional laboratory work by the Universities which they consider necessary. (Fourth year work is currently being funded.)

(2) The design of a pilot plant including cost and time estimates.

(3) The possibilities of development of a commercially scaled plant for both purified domestic refuse and other waste materials containing cellulose, with an intake in the range of 400-1,000 tonnes/day of raw refuse.

(4) Commercial relationships between sponsors and third party.

(5) Methods of financing future development.

(6) A possible comprehensive development programme.

(7) Other factors considered to be relevant.

COMPANY NOTICES

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U.S.\$25,000,000

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Guaranteed by ARTIFER, INCORPORATED

NOTICE IS HEREBY GIVEN to the holders of all outstanding Guaranteed Floating Rate Notes Due 1988 (the "Notes") issued by Artifer Antilles N.V. (the "Company") and guaranteed by Artifer, Incorporated that the Company hereby offers to purchase any or all of the Notes at a purchase price, with respect to each Note, equal to 100% of the principal amount thereof plus accrued interest from November 16, 1982 to May 16, 1983, or an aggregate of \$25,000,000 for each \$500,000 principal amount of Notes (the "Purchase Price"). Those holders of Notes wishing to tender Notes for purchase hereunder should hand deliver said Notes or send them by registered mail, in each case together with all unattached coupons attached thereto (including the coupon payable on May 16, 1983), to the office of Citibank, N.A., Seestrasse 25, CH-8002 Zurich, Switzerland; Attention: Mr. Didier Drouard, Manager, Securities Department, so as to arrive on or before May 16, 1983 (the "Purchase Date"). If any Note is tendered without having attached thereto all unattached coupons, the surrender of such tendered coupons may be waived by the Company if there is furnished to such security or indemnity as it may require to save it harmless. Payment of the Purchase Price of each Note will be made on the Purchase Date by a United States dollar check or bank draft drawn on a bank in New York City or by transfer to a United States dollar account maintained by the holder of the Note with a bank in New York City.

The Company reserves the right to purchase any and all Notes tendered to and/or received by it after the Purchase Date at a price equal to 100% of the principal amount of each tendered plus accrued interest from the Purchase Date to the date of tender.

For and on behalf of ARTIFER ANTILLES N.V. By CITIBANK, N.A. as Fiscal Agent

NOVA SCOTIA POWER CORPORATION

9 1/2% Sinking Fund Debentures 1989

The Bank of Nova Scotia Trust Company (Channel Islands) Limited as Fiscal Agent announces that the entire redemption payment of US\$2,100,000 due 15th May, 1983, has been met by purchases in the market.

Queen's House, 15-15 Don Road, St Helier Jersey, Channel Islands

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At NEC, we have always believed that automation effectively raises productivity and lowers business costs.

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computers as it does to our small, personal ones like the PC-8000—the best-seller in Japan. The NEC teleconference system takes our philosophy yet another step.

Combining a variety of data processing systems with communications systems, it can save businesses millions of dollars annually—and business people thousands of hours of needless travel. These are only a few of over 15,000 different industrial, business and home electronics products manufactured by NEC.

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BUILDING AND CIVIL ENGINEERING

STATE INTERVENTION

Labour plan under attack

THE CONSTRUCTION industry is fighting against Labour's plans for substantial state intervention in its business.

In a joint statement which speaks of a fresh round of skirmishing between the two old adversaries, the Federation of Civil Engineering Contractors and the National Federation of Building Trades Employers, say they are saddened to see the Labour Party "clinging to outdated proposals" for a nationalised construction company and for an expanded role for local authority direct labour building departments.

Labour's proposals, contained in "The New Hope For Britain," the party's General Election plan on which its manifesto will be based, have also provoked a new film campaign by Aims of Industry, with "generous" support from the construction industry.

The joint statement said: "On the one hand the Labour Party is proposing to begin a huge programme of construction so that we can start to build our way out of the slump."

"On the other hand, they are proposing measures for substantial state intervention in the free enterprise construction industry which can only impair our capacity to respond to the sharply increased demands to be made on us."

The Federations said the Labour Party's policies were not new and the industries' total opposition to them was "clearly spelled out" before the last election.

Labour's plans for dramatic increases in spending, the Federations claimed, coupled with more state intervention, would inevitably lead to much higher building costs for both public and private clients and

"ultimately fewer jobs."

Labour's proposals for extending public ownership into the construction industry include:

● The establishment of a National Construction Corporation, based on the acquisition of one or more major contractors, as a peacemaking public competitor in the national and regional construction market, or possibly through the creation of a major new company.

● Extension of the activities of local authority direct labour organisations or the creation of new ones.

● Encouragement and support from the Government for the development of workers' co-operatives at the "jobbing" end of the industry.

● Extension of public ownership into such sectors as glass, sanitary equipment and other building materials industries, through the establishment of a holding company—the Building Materials Corporation—which

would acquire a major stake in each of these sectors.

The National Council of Building Material Producers has attacked the latter proposal, promising to take appropriate steps to counter them.

Mr Nigel Chaldecott, BMP director general, said there were some companies in his sector which were monopolies, as defined by legislation, but various mechanisms supported by all Governments existed to ensure that the public interest was safeguarded.

"These well-managed companies have a sound record of innovation and competitiveness, and are successful," he said. "They have to meet open competition from alternative products and construction methods."

It was "more than difficult" to see how public monopolies or a public stake in such industries could be more successful, provide more employment and satisfy the public so well without in any way calling on the public purse.

LISA WOOD

OVERSEAS CONTRACTS

£15m Barbados bank

HIGGS AND HILL CARIBBEAN, a subsidiary of Higgs and Hill, has been awarded a contract for the construction of the headquarters building for the Central Bank of Barbados in Bridgetown, Barbados. The building, valued at about £15m, will be built around a central courtyard providing natural light and ventilation. The public will have access to banking facilities on the

ground floor and there will be a further nine floors of offices. Lifts, staircases and services will be housed within 12 towers, to be built of in situ concrete using "slip form" techniques. The towers, a striking architectural feature, support floors formed with steel beams and decking and the whole building will be clad with precast concrete panels.

Biggest painting order

HAT Group's industrial painting subsidiary JACK TIGHE has been awarded a seven-year £30m contract for Brunel Shell Petroleum. The work, which covers over 200 offshore platforms in the South China Sea being used mainly for drilling, production and accommodation, will be handled through Tighe's subsidiary Q. A. P. Jack Tighe (Offshore) based in Brunel, with marine support vessels provided by Solus Ocean Systems Inc, Texas.

Homes to be made from straw in China

A Suffolk firm has signed a £1m contract with the People's Republic of China, who want to produce houses from rice and straw. Stowmarket-based STRAMIT INTERNATIONAL will supply and install two factories in China to manufacture rigid building panels from waste rice and wheat straw, using the company's Stramit process. The two factories near Peking should be producing early next year. The rice and wheat straw board is used to build low-cost homes.

Indonesian action stirs up a breeze

A FUTURE challenge to Singapore's dominant position in South East Asian commerce has moved a significant step forward with the recent completion of an airstrip on the Indonesian island of Batam.

Indonesia has long cast covetous eyes on Singapore's success as the industrial and trading fulcrum in the area and, particularly, at the advantages offered to the state by its free port status. As long as ten years ago Indonesia proposed the creation of its own Singapore on the island of Batam, just 20 kilometres away from the original ground of the Singapore Straits.

But the project was hampered both by the under-development and inaccessibility of the island and by a fall in Indonesia's earnings from oil and gas exports.

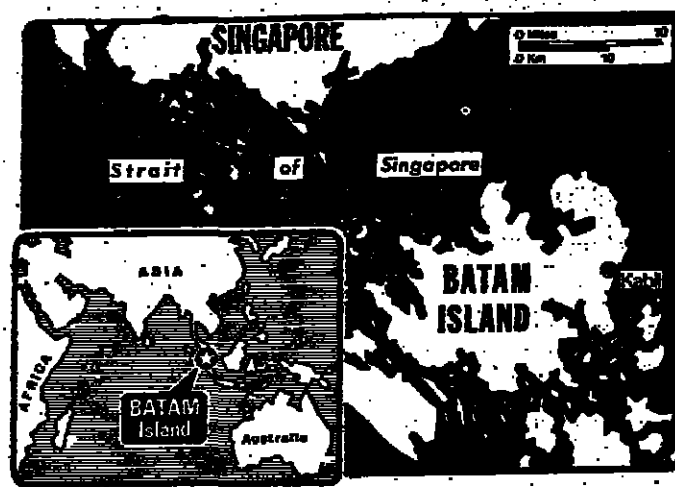
The problems still exist, but the project was revived at the end of the 1970's by Dr B. J. Habibie, Indonesia's Minister of Technology, who saw the potential for the Batam development against a background of increasing labour shortage and rising labour costs in Singapore. Batam, he reasoned, could offer a new, low-cost location for labour intensive businesses at a time when Singapore is moving increasingly into low-labour content sectors like services and electronics.

As a result, the whole of Batam island is now designated a duty-free bonded warehouse, with major incentives offered to potential foreign investors. Fundamental to the programme, however, was the development of an infrastructure on the island, including roads, a major sea port and an airfield capable of handling inter-continental jets.

Although no final completion date was put on the overall project, the airfield was regarded as an essential prerequisite because of the island's inaccessibility. Any Indonesian wishing to get to the island had to travel for hours by ferry from the nearest island or fly to Singapore for the much shorter ferry journey from there to Batam.

Even so, the airstrip contract was not awarded until July 1981. It covered the expansion of a 900 metre light aircraft strip into a rigid pavement capable of handling DC9 aircraft within 12 months and at a cost of \$5m. Given the conditions on the island, that was a tough enough task in itself. In the event, however, the specification was upgraded, doubling both the contract time and its value, as the project progressed.

The contract for the civil engineering works was won by PT



Balfour Beatty Sakti which had to establish a beach head at Rabit on the east coast of the island and then hack a way through 13 kms of bush to reach the airfield site, building a road as they went so that the earthmoving plant could follow.

Meanwhile, the Development Authority changed the runway design from a rigid to a flexible pavement and upgraded it to Airbus standards. This meant that the contractors had to mobilise a second batch of plant for cement stabilisation, plus a full blacktop fleet comprising an asphalt plant, two paving machines, rollers and ancillary equipment.

Overall, the job has involved a muckshift of some 2,250,000 tonnes of asphaltic concrete and the construction of a 13,500 sq

metres apron in pavement quality concrete; the whole to be executed in the middle of a jungle.

Despite these difficulties the airfield is already in use and is on schedule for final completion by the middle of this year. The official inauguration took place in February and the national airline Garuda started twice-weekly flights to Batam at the beginning of this month.

Much still needs to be done on Batam, including the building of a deep water port, before Singapore will really start to feel the wind of competition. But, with the airfield complete, the road network expanded and the establishment of initial industrial development, Indonesia has at least stirred up a breeze.

TOM SEALY

UK CONTRACTS

Gilbert Ash takes £5m in Scotland

GILBERT ASH CONSTRUCTION, a Bovis company, has been awarded three building contracts with a total value of over £5m. The largest is the blind re-furbishment contract at the former National College of Food Technology. A £1.8m contract at the Hospital of St John and St Elizabeth, St John's Wood, comprises a new main staircases, two operating theatres, refurbishing four wards and carrying out repairs to structural concrete. At St Stephen's Hospital, Fulham Road, two wards are being re-furnished to form a dermatology unit for the Victoria Health Authority. The contract, worth over £300,000, includes mechanical and electrical services, a suspended ceiling and strengthening to the floors.

A new telephone office in Aldershot, Hampshire, will be built by steel frame building manufacturer CONDER

BRIDGE WALKER, building contractors. Laboratories and offices for Beecham Products Research department, Weybridge, form part of a £2.2m total re-furbishment contract at the former National College of Food Technology. A £1.8m contract at the Hospital of St John and St Elizabeth, St John's Wood, comprises a new main staircases, two operating theatres, refurbishing four wards and carrying out repairs to structural concrete. At St Stephen's Hospital, Fulham Road, two wards are being re-furnished to form a dermatology unit for the Victoria Health Authority. The contract, worth over £300,000, includes mechanical and electrical services, a suspended ceiling and strengthening to the floors.

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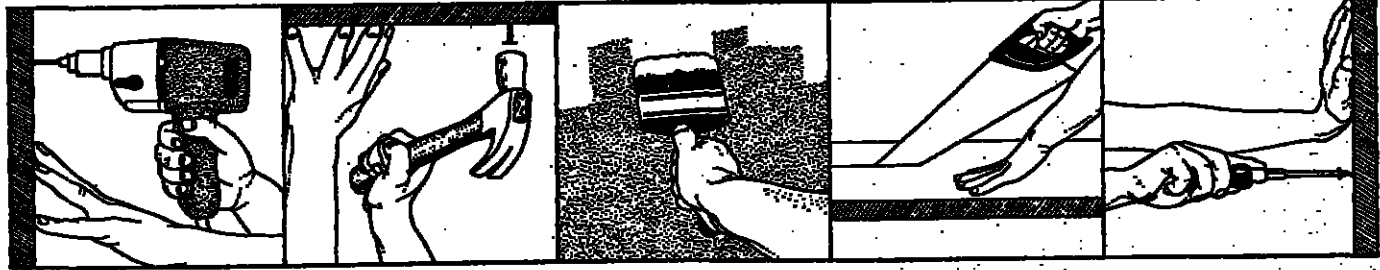
SOUTHERN under a £4.2m design and build contract from British Telecom. The Queen's Award winning Conder Kingsworthy building design will be extended to a seven-storey office block. Work began on April 18, and the 10,147 sq metre building should be ready for occupation in 72 weeks.

WILLIAM TAWSE, part of Aberdeen Construction Group, has the Stage One contract of the Mannofield water treatment works in Aberdeen, worth over £3m. The works are required for purification of water pumped from the River Dee and will consist of the construction in reinforced concrete of a pumping station; sedimentation, filtration and sludge thickening tanks; and associated building work, pipe work, plant installation, site complete. Stage One will be capable of handling 37.5m litres of

treated water daily and can be extended to handle double this amount. Work will take 23 months to complete. Tawse also has a contract worth £170,000 for extension of a quarry at North Esplanade East, Aberdeen.

COSTAIN HOMES has been selected by Wycombe District Council to develop "Area Six at Cresser, High Wycombe, a housing scheme involving the building for sale of 100 new homes. This is a joint venture arrangement with the council providing the land and the developer the finance to build the units and to carry out the marketing. The new homes will be offered first to persons nominated by the council, with the opportunity of purchasing at a price below current market value. The contract, which has a turnover value of £2m, is due to start at the end of May and will be completed within 18 months.

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THE GOVERNOR AND COMPANY OF THE BANK OF ENGLAND are authorised to accept tenders for the issue of the above Stock.

The principal of and interest on the Stock will be a charge on the National Loans Fund, with recourse to the Consolidated Fund of the United Kingdom.

The Stock will be repaid at par on 14th June 1983.

The Stock will be registered at the Bank of England or at the Bank of Ireland, Belfast, and will be transferable, in multiples of one penny, by instrument in writing in accordance with the Stock Transfer Act 1963. Transfers will be free of stamp duty.

Interest will be payable half-yearly on 14th June and 14th December. Income tax will be deducted from payments of more than £5 per annum. Interest warrants will be transmitted by post. The first interest payment will be made on 14th December 1983 at the rate of £3.0438 per £100 of the Stock.

Tenders must be lodged at the Bank of England, New Issues(A), Watling Street, London, EC4M 3AA not later than 10.00 A.M. ON WEDNESDAY, 13TH APRIL 1983, at any of the Branches of the Bank of England or at the Glasgow Agency of the Bank of England not later than 3.30 P.M. ON TUESDAY, 12TH APRIL 1983. Tenders will be received between 10.00 A.M. and 12.00 P.M. ON TUESDAY, 12TH APRIL 1983, and 10.00 A.M. and 12.00 P.M. ON MONDAY, 14TH APRIL 1983.

Each tender must be for one amount and at one price. The minimum price, below which tenders will not be accepted, is £36.00 per cent. Tenders must be made in the minimum price which is a multiple of 25p. Tenders lodged without a price being stated will be deemed to have been made at the minimum price.

A separate cheque representing a deposit of the rate of £25.00 for every £100 of the nominal amount of Stock tendered for must accompany each tender; cheques must be drawn on a bank in, and be payable in, the United Kingdom, the Channel Islands or the Isle of Man.

Tenders must be for a minimum of £500 Stock and for multiples of Stock as follows:

Amount of Stock tendered for Multiple
£100-£1,000 £100
£1,000-£5,000 £500
£5,000-£10,000 £1,000
£10,000-£50,000 £5,000
£50,000 or greater £25,000

Her Majesty's Treasury reserve the right to reject any tender or part of any tender and may therefore allot to tenders less than the full amount of the Stock. Tenders will be ranked in descending order of price and allotments will be made to tenders whose tenders are at or above the lowest price at which Her Majesty's Treasury decide that any tender should be accepted (the allotment price), which will be not less than the minimum tender price. All allotments will be made at the allotment price which is accepted, and which is made at a price above the allotment price will be allotted in full tenders made at the allotment price may be allotted in full or in part only. Any balance of Stock not allotted to tenders will be allotted at the allotment price to the Governor and Company of the Bank of England, Issue Department.

Lenders of allotment in respect of Stock allotted, being the only form in which the Stock may be transferred prior to registration, will be despatched by post at the risk of the tenderer, but the despatch of any letter of allotment, returned likewise, Payment in full may be made at any time after allotment but no discount will be allowed on such payment. Interest may be charged on a day-to-day basis on any overdue amount which may be accepted at a rate equal to the London Inter-Bank Offered Rate for seven day deposits in sterling ("LIBOR") plus 1 per cent per annum. Such rate will be determined by

ISSUE OF £1,100,000,000

10½ per cent

TREASURY STOCK, 1989

MINIMUM TENDER PRICE £96.00 PER CENT

PAYABLE AS FOLLOWS:

Deposit with tender £25.00 per cent
On Monday, 14th May 1983 £25.00 per cent
On Monday, 13th June 1983 Balance of purchase money

INTEREST PAYABLE HALF-YEARLY ON 14th JUNE AND 14th DECEMBER

This Stock is an investment falling within Part II of the First Schedule to the Trustee Investments Act 1961. Application has been made to the Council of the Stock Exchange for the Stock to be admitted to the Official List.

THE GOVERNOR AND COMPANY OF THE BANK OF ENGLAND are authorised to accept tenders for the issue of the above Stock.

The principal of and interest on the Stock will be a charge on the National Loans Fund, with recourse to the Consolidated Fund of the United Kingdom.

The Stock will be repaid at par on 14th June 1983.

The Stock will be registered at the Bank of England or at the Bank of Ireland, Belfast, and will be transferable, in multiples of one penny, by instrument in writing in accordance with the Stock Transfer Act 1963. Transfers will be free of stamp duty.

Interest will be payable half-yearly on 14th June and 14th December. Income tax will be deducted from payments of more than £5 per annum. Interest warrants will be transmitted by post. The first interest payment will be made on 14th December 1983 at the rate of £3.0438 per £100 of the Stock.

Tenders must be lodged at the Bank of England, New Issues(A), Watling Street, London, EC4M 3AA not later than 10.00 A.M. ON WEDNESDAY, 13TH APRIL 1983, at any of the Branches of the Bank of England or at the Glasgow Agency of the Bank of England not later than 3.30 P.M. ON TUESDAY, 12TH APRIL 1983. Tenders will be received between 10.00 A.M. and 12.00 P.M. ON TUESDAY, 12TH APRIL 1983, and 10.00 A.M. and 12.00 P.M. ON MONDAY, 14TH APRIL 1983.

Each tender must be for one amount and at one price. The minimum price, below which tenders will not be accepted, is £36.00 per cent. Tenders must be made in the minimum price which is a multiple of 25p. Tenders lodged without a price being stated will be deemed to have been made at the minimum price.

A separate cheque representing a deposit of the rate of £25.00 for every £100 of the nominal amount of Stock tendered for must accompany each tender; cheques must be drawn on a bank in, and be payable in, the United Kingdom, the Channel Islands or the Isle of Man.

Tenders must be for a minimum of £500 Stock and for multiples of Stock as follows:

Amount of Stock tendered for Multiple
£100-£1,000 £100
£1,000-£5,000 £500
£5,000-£10,000 £1,000
£10,000-£50,000 £5,000
£50,000 or greater £25,000

Her Majesty's Treasury reserve the right to reject any tender or part of any tender and may therefore allot to tenders less than the full amount of the Stock. Tenders will be ranked in descending order of price and allotments will be made to tenders whose tenders are at or above the lowest price at which Her Majesty's Treasury decide that any tender should be accepted (the allotment price), which will be not less than the minimum tender price. All allotments will be made at the allotment price which is accepted, and which is made at a price above the allotment price will be allotted in full tenders made at the allotment price may be allotted in full or in part only. Any balance of Stock not allotted to tenders will be allotted at the allotment price to the Governor and Company of the Bank of England, Issue Department.

Lenders of allotment in respect of Stock allotted, being the only form in which the Stock may be transferred prior to registration, will be despatched by post at the risk of the tenderer, but the despatch of any letter of allotment, returned likewise, Payment in full may be made at any time after allotment but no discount will be allowed on such payment. Interest may be charged on a day-to-day basis on any overdue amount which may be accepted at a rate equal to the London Inter-Bank Offered Rate for seven day deposits in sterling ("LIBOR") plus 1 per cent per annum. Such rate will be determined by

THIS FORM MAY BE USED

This form must be lodged at the Bank of England, New Issues (A), Watling Street, London, EC4M 3AA, not later than 10.00 A.M. ON WEDNESDAY, 13TH APRIL 1983, or at any of the Branches of the Bank of England or at the Glasgow Agency of the Bank of England not later than 3.30 P.M. ON TUESDAY, 12TH APRIL 1983.

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Amount of Stock tendered for Multiple
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£1,000-£5,000 £500
£5,000-£10,000 £1,000
£10,000-£50,000 £5,000
£50,000 or greater £25,000

Amount of deposit enclosed, being £25.00 for every £100 of the nominal amount of Stock tendered for (shown in Box 1 above):

The price tendered per £100 Stock, being a multiple of 25p, not less than the minimum tender price of £96.00:

I/We hereby engage to pay the instalments as they shall become due on any allotment that may be made in respect of this tender, as provided by the said prospectus.

I/We declare that any letter of allotment in respect of Stock allotted to me/us by the Bank of England, will be sent to me/us at the address shown below.

April 1983 SIGNATURE of, or on behalf of, tenderer

PLEASE USE BLOCK LETTERS

MR/MRS MISS FORENAME(S) IN FULL SURNAME

FULL POSTAL ADDRESS:-

FT POST-TOWN COUNTY POSTCODE

A separate cheque must accompany each tender. Cheques should be made payable to "Bank of England" and crossed "Treasury Stock". Cheques must be drawn on a bank in, and be payable in, the United Kingdom, the Channel Islands or the Isle of Man.

The price tendered must be a multiple of 25p and not less than the minimum tender price. If the tenderer is not a resident in the United Kingdom, this tender will be deemed to have been made at the minimum tender price. Each tender must be for one amount and at one price.

TECHNOLOGY

COMPUTER LITERATE TODDLERS BREAK INTO A \$3BN MARKET

Reaching the keyboard is the problem

BY LOUISE KEHOE IN CALIFORNIA

WHO'S AFRAID of computers? Certainly not the growing number of "Computer Toddlers" who are becoming a major factor in the \$3bn market for home computers. Perched on top of a pile of cushions to reach the keyboard these preschool children become masters of the machines that their elders. They are becoming "computer literate" before they can read, and sometimes before the word "computer" is a part of their vocabulary.

These are not especially gifted youngsters, just ordinary two to five year olds who in increasing numbers are being given the opportunity to learn from and have fun with computers.

High growth
As a group, these children represent a major new commercial opportunity for computer and software vendors. The explosion in home computer sales, combined with the current "mini baby boom" spells out a huge potential market for computer "learning games" designed to appeal to preschool children and their parents.

The trend toward younger computer users is already established. According to U.S. market researchers more than half of the home computer users in the country are under 34 inches tall (and presumably under 14 years old). Though

the researchers have not yet analysed the use of computers by those who are under 40 inches in height, the recent proliferation of new pre-school software products indicates a high growth market.

Future Computing Inc, a market research company forecasts that the U.S. market for personal computer educational software (not including the cost of the computer itself) will grow to \$1.8bn by 1987. More than 70 per cent of that market will be in programs designed for use at home rather than at school, they forecast. A high proportion of those home users will be in the "toddler" age group.

Children's software has, until very recently, been a cottage industry created by innovative educators and creative parents. Suddenly, that seems to be changing. Leading the trend are companies such as the Learning Company of Fort Valley, California.

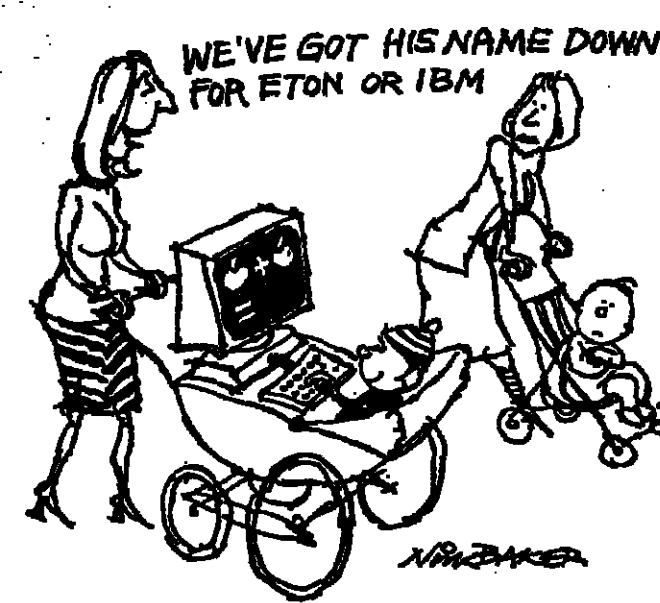
Founded by an ex-teacher, the company has focused on producing programs that teach concepts and logic rather than reading and arithmetic. With the recent appointment of a new president and marketing director, the learning company is now aiming to transform itself into a more commercially minded organization building on its established reputation.

The learning company games make use of beautiful graphics and simple melodies to keep the child's attention. A rule established by the company's products is that the "right" answer to a problem presented to the child produces a "reward" in terms of graphics or sound. The "wrong" answer does nothing.

This corrected a major problem with earlier education programs that produced an exciting buzz when the child gave the wrong answer.

One of the most popular beginner's programs is the learning company's "Juggles rainbow" which teaches the ideas of above and below, left and right.

To overcome the obvious problems of giving instructions to pre-readers, the Learning Tree Company of Long Island



New York has introduced a "natural voice" addition to the computer in the form of a tape recorded set of instructions that are controlled by the computer program.

Experimenting with children in nursery schools, the company has developed 57 programs for the Commodore Pet that three to five year olds can use on their own.

Learning to program a computer to perform simple tasks can start very early with a game called "face maker" published by Spinnaker. The program allows a four year old to design a face by selecting weird looking facial features—hair, eyes, nose, mouth and ears. With just a few moments of instruction the child can learn to use the program, and in the process pick up how to use menu-driven programs.

The next step is to "program" the face to go through a series of gyrations such as winking, crying and sticking out its tongue—guaranteed to delight an under-five.

For the child that is learning to read, the learning company offers "Magic Spells," a game in which words are jumbled and must be sorted out to stop the demon stealing the gold.

Spinnaker publishes "Story Machine," a program that animates simple statements such as "The Dog Runs" to encourage the young writer.

Xerox has recently started distributing a new series of children's programs called "Stickybeats." The most elementary is a counting program for three- to six-year-olds.

Reflecting the growing sophistication of the pre-school software market, Xerox packages the program in a brightly coloured book-like cover and includes a picture book and a sheet of stickers along with the floppy disk.

Atari is also about to enter the market with a set of video games that use Disney characters and muppets to teach the alphabet, numbers and simple arithmetic to three to seven-year-olds.

Oscar (well known to all Sesame Street watchers as the bad-tempered character who

lives in a garbage can) will pop up and smile for the child who has collected the right number of pieces of trash and deposited them in the bin on the video screen.

Cookie Monster runs around a maze gobbling up cookies along the way in another Atari game.

To suit the manipulative skills of small hands, Atari has designed a new controller unit for the video games console. The 5 x 7 in keyboard has 12 keys that are designated for different functions by colourful overlays. Atari's designers promise that the unit will survive any amount of physical punishment including being drenched with milk.

Texas Instruments starts youngsters off with its 99/4A personal computer that uses rugged cartridges (rather than tapes or floppy disks) to store programs. The company offers a range of programs that make use of colourful graphics to teach number recognition, counting, simple arithmetic, alphabet and pre-reading skills. Do pre-school children really benefit from the use of a computer?

Sticky fingers

The computer and software manufacturers are giving American parents the hard-sell treatment with messages that suggest computer games are as important as picture books in giving little Johnny a head start in his education. More persuasive, however, is the obvious pleasure that "playing computer" produces among this age group.

As the mother of two "computer toddlers" this reporter frequently wipes sticky finger marks off the video screen and keyboard before reclaiming her computer to work for The Financial Times.

ELECTRONIC BANKING

France anxious to lead the world

BY ELAINE WILLIAMS

THE third main stage in France's electronic banking trials began recently at Saint Etienne. France is keen to show the world that it has taken a lead in electronic banking having planned its experiments as long ago as 1978.

Dubbed the Point-Rubis project, it uses a plastic card as a direct replacement for cash. Some FFfr 30m has been invested in the experiment with 75 per cent of the funds coming from financial institutions. The remainder of the funds is provided by the commercial sector plus subsidies from the Direction Generale des Telecommunications and the Agence de l'Informatique.

These trials are being carried out to give banks and retailers a clear picture of the way ahead in electronic banking. The banks are anxious to develop a coherent interbank system to business and consumers. It will require very heavy investment in technology for banks in addition to the high costs they bear for cheque processing.

Electronic banking does, however, offer the hope of reducing the costs of cheques and credit card frauds, and reducing the number of cheques being processed.

For the retailer the benefits are likely to be faster processing at the checkouts, less cash handling and its inherent problems and less risk of unpaid bills. The customer, too, should reap some benefits in the form of security from card abuse though he will be parted from his cash more quickly than by using a cheque.

In the Point-Rubis project a direct data communications link is set up between the specially designed checkouts, known as point of sales terminals in the

jargon of electronic retailing, and the relevant bank's central processing computer.

A message is transmitted with all the details of the proposed transaction such as identification of the retailer, customer verification, amount of sale to the central computer. The computer has access to the customer's account and can allow the sale to take place if sufficient funds are available. It can transfer money from the customer's to the retailer's accounts taking only a few seconds to complete the entire operation.

Initially the system will not be an on-line system and processing will be carried out at the end of each day. However, full on-line working will be achieved when the second computer centre is set up in a few months' time.

The trials are expected to involve about 150,000 individuals of which about two-thirds are holders of conventional credit cards such as Visa which are compatible with the system. Each cardholder can spend FFfr 2,000 a day with a limit of FFfr 5,000 a week, though Visa card-owners can opt for a higher limit.

Customers can use their cards at 350 point of sales terminals. About 100 are installed in department stores while the remainder are in various retail stores in the area. This covers about 70 per cent of commerce in Saint Etienne.

The main contractor for the system is the Societe Generale de Gestion et des Services. Much of the hardware was designed by two French companies, Electronique Serge Dassault and SECURE. The experiment uses the Transpac public data network to link POS terminals to

the banking computers. The experiment will last 30 months in Saint Etienne. The town with its 220,000 inhabitants was chosen at the test site because it is a regional centre with an extensive business activities. Because it has a self-contained economic life the banks believe that significant conclusions can be drawn from any results.

Point Rubis is also important because the trials involve all banks and the entire local financial community. With the exception of Credit Agricole—joined the project. Many different retail outlets are involved.

The other two experiments on electronic banking which have already been set up in France are not instant or on line systems as is Point Rubis. In Aix-en-Provence an off-line system using magnetic stripe cards was tested while at the three towns of Blois, Lyons and Caen so called smart cards, which incorporate micro-processors, are being used at retailers' point of sale terminals.

FINANCIAL INSTITUTIONS INVOLVED IN POINT RUBIS

Banque Centrale Des Cooperatives et des Mutuelles
Banque de France
Banque Morin Paris
Banque de Paris et des Pays Bas
Credit Postaux
Banque Populaire de la Loire
Banque Rhone et Loire
Credit Commercial de France
Banque Nationale de Paris
Banque Worms
Credit Lyonnais
Societe Generale
Societe Lyonnaise de Depots
Caisse d'Epargne de St Etienne
Chambre Syndicate des Banques Populaires

THE MICRO.

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Business Systems

PT5000

Diving Container system

CONTAINERISED divers are on the way to the North Sea via a 14-strong Wigan company which for some years has been involved in research on the problems of life support systems for marine and civil engineering contractors engaged on undersea repair, inspection or maintenance.

Safety Air Services (40, Warrington Lane, Wigan) offers a purpose-built container with a twin lock decompression chamber with air and oxygen services connected, which, it claims, can be operational within an hour of arrival on site.

The decompression chamber can accommodate up to six divers with transfer under pressure facilitated by the twin lock design. Diesel powered air compressors, supplemented by high air pressure back up are available with ancillary equipment designed to suit

the customers' requirements. Mr P. Copley (0942 322141) will tell you more.

Benchwork Piercing press

REDMAN Engineering of Swindon has designed a new bench mounted press for straight line piercing, which it claims offers metal working companies a versatile low cost alternative to conventional brake presses where the latter's higher capacity may be required only occasionally.

The Unifress 654 allows unit tooling to be located across the whole 650 mm width of the bed and will accept any standard Unifress. It has a 10-tonnes capacity, can handle up to 3-mm thick mild steel and costs less than £2,000. Mr Herbert Galloway, Redman's Sales Manager, is at Hawksworth, Swindon (0793 26594) for more details.

Six packages
SIX SOFTWARE packages for use on the Vic home computer have been introduced by Audiogenic of Reading. The programs include processing and a database storage and retrieval system. More details on 0734 585447.

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AND THIS IS NOT A MOMENT TOO SOON.



THE MANAGEMENT PAGE

EDITED BY CHRISTOPHER LORENZ

AT THE beginning of 1982, Unipart, the parts and accessories division of BL, Britain's major car manufacturer, cut 1,000 jobs, a third of its then workforce of 3,000. The cuts were made in the face of what John Neill, Unipart's 36-year-old managing director, describes as "the most bitterly competitive conditions I have known." The cutback was also achieved with little demur from the unions.

The redundancies formed part of a programme to tackle a weak market without "stupidly throwing away our sales margins," says Neill. It enabled profitability to be improved last year and, he maintains, "I expect profitability to improve further, even if there is no increase in demand."

More recently, a novel employee incentive scheme has been introduced. It is based on just one criterion: return on assets. No other criteria, such as increased output or sales volume, will be taken into account. "The scheme must involve employees sharing the overall risks, as well as the rewards, of the company," comments Neill.

Last year's shake-out affected all employees. As well as cutting back the workforce three levels of management disappeared: from BL central staff dealing with Unipart; at Unipart group level; and at Unipart company level. "We took the costs, confusion and complexity out," says Neill.

Neill explains that "the central staffs were crushing entrepreneurial initiative. Not because they were bad, but because three layers spend far too much time examining alternatives. We made everyone—at manufacturing, distribution, and retailing levels—profit centres, making it clear they either made a profit or closed."

That included manufacturing for BL itself. Neill was quite prepared to tell Austin Rover's chairman, Harold Musgrove, to get parts elsewhere if Unipart could not make and supply them profitably. Equally, says Neill, Musgrove was taking at least as tough a line on supplies with Unipart as with suppliers from outside the BL "family."

Neill took a hatchet to other overheads, reorganising transport operations, for example, to the extent that they are lower now in absolute terms than in 1980. The latest, and biggest single casualty is at Baginbun—where Unipart's showpiece 270,000 sq ft warehouse is being closed. It opened only in 1979, cost £2m, is fully computerised, and was surveyed by psychologists to suggest the right colour schemes for maximum productivity.

'They either made a profit or closed'

John Griffiths reports on the major surgery carried out at Unipart, BL's components offshoot



John Neill: "Employees must share the risks as well as the rewards."

The 170 workers are either being moved elsewhere, or made redundant, again with scarcely a murmur from the unions. Neill appears to have done it all by persuasion, with plenty of informal advance warning. The warehouse had to go "for the company's good"—it was no longer needed.

In the same way, he "persuaded" busloads of Cowley workers into daily trips to Coventry to cover temporary heavy work loads in the Midlands; even senior executives were pressed into performing song and dance routines in front of workers and franchisees as part of a "motivational" road show.

Nevertheless, he acknowledges that, during the past year, "the scale of change has been a shock to the company."

It has been no less of a shock to Unipart's own suppliers. At the start of 1981, Neill wrote to all Unipart suppliers demanding a price freeze. About half said they would co-operate. A quarter acceded on the second prod. The others wrote back to suggest, effectively, that Neill was out of his mind.

Their letters went straight in the bin—"we got new ones," observes Neill dismissively.

A similar letter went out at

the beginning of 1982—but this time demanding a 5 per cent cut. The results were almost precisely the same. "I simply will not accept that we have to be outperformed by the Japanese or anyone else." The exercise is being repeated this year.

While there has been little that Unipart could do about volumes in original equipment business, its strategy has been to offset this decline through selective sales drives in the aftermarket.

It has zeroed in on specific product lines: in particular, oil, antifreeze, batteries and brakes. Neill insists, however, that "I hate cut-throat competition which gives away margins." Instead, Unipart has spent money on protecting them. Hence its "life guarantees."

Samson batteries cost a lot more than others that can be bought elsewhere; but the marketing concept seems to have worked. Sales, claims Neill, are going through the roof.

Unipart's decision last year to attack the brakes replacement market left some major brake makers furious.

When Unipart could find no industry standards in terms of safety, durability or performance, it employed engineers to set some and then sought sup-

pliers to meet them, not necessarily in the UK.

It advertised a scheme on television whereby 1,500 garages offered free brake tests. Unipart claimed that 50 per cent of the cars tested had faulty brakes which, it implied, showed that some UK manufacturers were applying a double standard on quality between original equipment and aftermarket supplies.

The TV campaign jammed Unipart switchboards until midnight and caused an outcry among brake makers. Since then, Unipart's brake sales have almost quadrupled despite the charging of premium prices.

These are some of the factors behind a sales-per-employee increase of 25.4 per cent compared with 1981 (when Unipart's sales actually rose 4 per cent, while direct workers were cut by 7 per cent and salaried staff by 17 per cent).

This is very much in line with the pattern of Unipart's return on assets. The figures show a decline to the end of 1980 and a sharp increase ever since. They lie behind BL's accounts statement that Unipart is self-funding and speculation that it is one of few BL parts which could prove an early candidate for privatisation.

Exploding the myth

FOR THE motor parts and accessories industry, 1982 was the year which "finally exploded the myth that the aftermarket is recession proof." So says John Neill, managing director of Unipart, the BL parts and accessories subsidiary.

The theory behind the "myth" is that, in a recession, cars will be retained longer, which should boost demand for replacement parts. Accessory sales should rise as owners compensate for having to live with a vehicle for longer than intended. This should in turn compensate both for lower volumes in the original equipment business in a weak new car market and for original equipment business lost to UK companies by higher imports of new cars.

It hasn't worked out that way, not least because some component makers have been virtually digging their own graves—or at least some very nasty pitfalls—to the benefit of the aftermarket. The tyre industry is the obvious example: radial tyres doubled mileage capability—and as a consequence ravaged the tyre-makers' replacement markets.

Assessing the precise size of the aftermarket is extremely difficult. In last year's Monopolies and Mergers Commission report advocating the end of exclusive franchising of replacement parts by manufacturers, the commission put the size of the total UK market, including accessories, at £2bn; estimated imports at £1.2bn to £1.5bn; and exports at £2.2bn to £2.5bn. It reckoned there were 300 main parts makers and concluded that a further 1,700 smaller companies were also involved.

About the only certainty is that last year the aftermarket declined. In these conditions Unipart has been unable to retain a firm grip on export sales, which accounted for just under £100m of its total sales of £350m last year (down £50m on the previous year). At the end of 1980 Unipart announced the launch of franchised wholesaling and retailing operations for Belgium, the Netherlands, Finland and Denmark, with plans to follow up in West Germany. But it found the going very hard and the exercise is now on "hold." Nevertheless, Neill insists that "when the time is ripe, we'll expand rapidly overseas."

Business courses

aw to succeed at data base design. London. April 26-28. Fee: £380 + VAT. Details from: Avant, 2 New Street, Carnforth, Lancs, LA5 9BX. Tel: 0524 74805. Telex: 65138.

Representation skills for marketers. Berkshire. May 18-20. Fee: members of the Institute of Marketing—£340 + VAT; non-members—£380 + VAT. Details from Harold Shilling, The College of Marketing Limited, Moor Hall, Cookham, Maidenhead, Berkshire SL6 9QH.

Managing corporate turnarounds. London. April 21. Fee: £150. Details from Sue Coan, London Business School, Sussex Place, Regent's Park, London NW1 4SA. Tel: 01-262 5050.

Principles of effective management. Kent. May 9-13. Fee: £200. Details from the Director of Client Services, Sundridge Park Management Centre, Bromley, Kent BR1 3TP. Tel: 01-464 4121.

Managing the computer resource. Oxford. April 24-25. Fee: £1,050. Details from Sarah Franklin, Oxford Centre for Management Studies, Kennington, Oxford OX1 5NY. Tel: 01895 735422. Telex: 83147 atm OCM.

Directors' marketing workshop 1983. Cookham. May 5-6 1983. Fee: £380 + VAT (non-members) £340 + VAT (members). Details from Harold Shilling, The College of Marketing Ltd, Moor Hall, Cookham, Maidenhead, Berkshire.

Strategic management in troubled times. Bradford. June 1-3. Fee: £200. Details from Diane Griffiths, University of Bradford Management Centre, Heaton Mount, Keighley Road, Bradford, West Yorkshire.

Marketing for finance directors. London. June 1-2. Fee: £250 + VAT. Details from Oyer International Business Communications Ltd, 3rd Floor, Bath House, 58 Holborn Viaduct, London EC1A 2EX.

Marketing management. London. April 25-May 6. Fee: £7,000 (non-members). BFR 70,000 (members). Details from the Registrar, Management Centre Europe, avenue des Arts 4, B-1040 Brussels, Belgium.

Consumer marketing in the UK. Cookham. May 22-26. Fee: £475. Details from College of Marketing, Moor Hall, Cookham, Berks. Corporate planning in practice. Bradford. May 23-27. Fee: £400. Details from Diane Griffiths, University of Bradford Management Centre, Heaton Mount, Keighley Road, Bradford, West Yorkshire.

Expatriates

Jobs in jeopardy on return to UK

BY ARNOLD KRANSBORFF

Uncertainty in the UK labour market and a conscious effort by many large companies to cut costs have changed the prospects and conditions of employment for many top British managers working abroad.

Over the past two years there have been significant changes in corporate policies towards cost-of-living allowances, housing and travel, according to a new survey of 32 major companies employing more than 7,000 expatriates in over 50 overseas countries. At the same time the jobs of expatriates, on repatriation, have become much less secure.

The survey, by Organisation Resources Consultants, an international personnel management consultancy, covers the engineering, computing, banking and petroleum industries, all of which have heavy representation overseas.

In the past it was usual for companies to guarantee a job—and often promotion—when an employee returned home from an overseas assignment.

The ORC survey found that this no longer the case in a majority of companies. In 1981, when the company's first expatriate survey was carried out, around 35 per cent of companies reported that they made no job guarantee to assignees on repatriation.

In 1982, this figure had jumped to 56 per cent. "This shows that everybody's job is in jeopardy, not only those who are home-based," observes ORC.

The new economic realities were also affecting the numbers of employees who received formal "orientation" training for overseas assignments.

In 1981 just over a fifth of companies did not provide any form of briefing to employees about cultural conditions in the country of assignment. A year later this figure jumped to 41 per cent.

There has also been a change in the way cost-of-living allowances are adjusted by some companies in response to changes in

exchange rates and inflation. While the most popular method of adjustment is still the annual review, 23 per cent of companies said in 1982 that they made immediate adjustments in the face of moving exchange rates and inflation.

In 1982 only 3 per cent said they reacted immediately, the rest preferring to adopt a "threshold" approach, says ORC. This involves making adjustments only when exchange rates and inflation reach pre-determined levels.

There is also a move to provide free overseas housing to the expatriate while leaving him to deal with his own home during his absence, the survey found.

In 1983 the number of companies which were not making any sort of charge for company-owned premises rose from 35 per cent to 50 per cent.

ORC explains that companies are now less willing to take on the burden of responsibility for home-country residences, preferring to leave the problem entirely in the hands of expatriates. To compensate, they provide overseas housing, at a free benefit, it adds.

The survey also noted a greater use of economy class air fares to and from the overseas location, whether for business or home leave. The number of companies which stipulated economy class for their overseas employees rose from 45 per cent to 56 per cent in 1982.

There has also been a shift in company policy towards home leave. In 1981 42 per cent of companies required their expatriates to return to the UK for their paid home leave. In 1982 this figure dropped to just over 18 per cent.

ORC says that this reflects pressure by expatriates as their employers to enable them to make the best use of foreign assignments. Frequently expatriates prefer to holiday in places other than the UK, says ORC.

* Policies and Practices for UK Expatriates, available from ORC, 78 Buckingham Gate, London SW1. Price £250.

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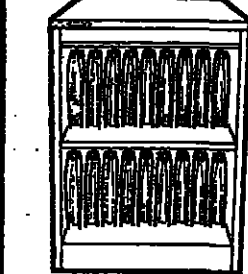
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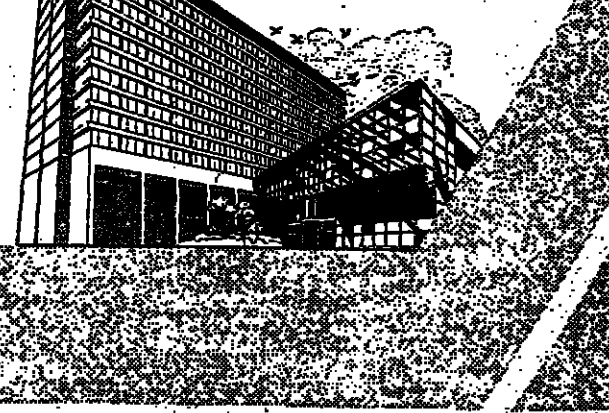
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THE ARTS

Architecture/Colin Amery

Bridging the gap



Brooklyn Bridge: a union of hearts and hands

When 500 rockets were fired simultaneously in May 1983 to mark the opening of the great Brooklyn Bridge, the event was seen as a great climax of the American desire to join East and West and to confirm man's subjugation of nature. The celebrations also confirmed the triumph of engineering and the completion of a marvel that was to become one of the wonders of the world. Today it is hard to recapture that particular sense of glory—a sense that is still so strong in America that this combination of industry, science, democracy and labour can conquer the world.

To remind us of that sense of achievement the Brooklyn Museum has arranged a splendid, learned and exciting exhibition, *The Great East River Bridge 1883-1983*, sponsored by the Chrysler Foundation, which will run at the museum in Brooklyn, New York, until June 12.

It is often said that architectural and engineering subjects do not make good exhibitions. I have always disagreed with this because, like so many other things, it depends how it is done. While nothing can replace the actual experience of walking between the criss-crossed cables and Walkman-equipped joggers on the promenade deck of the bridge, this exhibition manages to evoke a powerful sense of the bridge as a symbol and a part of the civic folk memory. It also, in simple didactic terms, shows how the wonder was created.

It is a good story, made particularly dramatic by the display of some of the great cache of detailed and colourful engineering drawings that was only recently rediscovered by an engineer in the carpentry shop of the New York City Department of Transportation. Now these 10,000 drawings have been catalogued and make a rare and impressive record of 19th century American engineering achievement.

Today the great thrill of a walk across the Brooklyn Bridge is the soaring drama of the Manhattan skyline. It is a good spot to observe the manic intensity of the development of mid-town. In fact from the bridge you can read the three-dimensional graph of New York property development. It is a most vivid way. This experience is heightened by the fact that the walkway on the bridge is raised above the traffic and decked like a ship—so that you are right on the web of steel that holds the densest structure together.

The exhibition tells the story of the construction through the personalities involved, particularly Washington A. Roebling

(1837-1926) who followed his father John Roebling in the building of the bridge. Washington believed management should take the same risks as labour and he constantly descended under water to the caissons. He paid the price by suffering terribly from the bends and as early as 1872 he became a permanent invalid. His wife Emily took over at this point, conveying her husband's orders from his bed and handling all his instructions. She is suitably commemorated by a fulsome tribute to the power of women behind every great man "on a plaque on the bridge itself. How she must have rejoiced when she was the first person to ride over the bridge in a carriage—carrying a crowing cockerel as a symbol of victory.

To convey the iconic significance of the bridge a rich and varied range of paintings and photographs has been gathered together. Artists have made the bridge a subject because of its triumphant beauty, cumulativeness, its sense of monumental scale, but not high artistic quality—perhaps too many have been generously included in the show.

The two Gothic-arched towers and the delicate threads of wire rope that apparently effortlessly carry the weight of the bridge

speak best of all for themselves. Don't go to the exhibition without walking at least one way on the bridge.

At the Hudson River Museum there is a major exhibition that relates to a book that has now been published in England. The book *Ornamentation* is by Robert Jensen and Patricia Conway and is published by Allen Lane in London and Clarkson Potter in New York.

Although the book is a useful compendium of the current trend towards a new decorative-ness in architecture and design—it is not until you see the exhibition—which runs until May 15—that the importance of the subject and the poverty of the results to date are fully exposed. The book is really very superficial—an attempt to create another journalistic movement, like Post-Modernism, without any real concern for the quality of the results. To say that *Ornamentation* is about the "surface of things rather than their essence" seems to me to expose the very weakness of the idea. To say that "it dances on the surface of technology" makes weak an idea that brings a new strength of purpose to architecture and design.

The show is a mixture of art objects and architecture and interiors—at no point does it

attempt any synthesis. In a way the success of the show is that it makes the spectator realise that soon some of the dross will fall away and a few good artists, architects and designers will be free, not to start a bogus new movement, but to realise in their own work the important sources of decoration for architecture.

The important names to look out for now and in the future are: Ned Smyth, artist, sculptor and mosaicist; Richard Glittig; Michael Graves; Roger Feder; Hans Hollein; Susana Torre; and Peter Wilson (for his garden). There is a lot of kitsch, jokey stuff that will not last for more than the life of the show and a great deal of work that is rightly included for its craft-manlike skills.

I will be writing later about the interesting area where the battles are to be fought—the point where the past, the present and sculpture appear to suggest important directions for architects to follow. Ornamentation is such a woolly concept that it seems to preclude any powers of discrimination on the part of the editors of the book and the show. This is sad because they are on the right lines. They, like so many of us, sense the need for enrichment, colour and delight in our new surroundings—but it is the search for quality that will produce the results not an appetite for variety.

Michael Graves is an architect who also designs furniture and fabrics and has an immaculate colour sense. His work shows a consistency that could carry us through this period of architectural transition. What is apparent is that American architects and designers have more opportunity than their British counterparts to flex their ornamental muscles. The climate is still so much freer and creative in the U.S. than in hide-bound Britain.

Another example of the openness of the American mind to architecture is a small exhibition that is also at the Hudson River Museum before touring much of New York State. It is called *Architecture on Paper* and has been compiled by Deborah Nevins. She sees the drawing as a vital part of the architectural process. She is not afraid to be didactic and her show explains what a plan is, how a section works, how designs are developed through drawings, the difference between working and presentation drawings. She has rich sources to draw on and demonstrates her points with work by Hector Guimard, Francois Blondel, Stanford White and several contemporary American architects. It is a crystal clear and careful show—educational without a hint of boredom.

For many years now, Budapest has celebrated new music in the autumn; but since 1981 it spreads another, more capacious festival over 10 days at the end of March. There are concerts—as many as four—every night and musicals and operettas and ballet; by day there are exhibitions and excursions within the city and out into the country (picturesque or saturated with history, frequently both) and at all hours a lot of exuberant gastronomy. And "Spring"? Well, there is in principle earlier and warmer than ours, in fact subject to British lapses, say five days at Festival-end were alternately sun-kissed and drear. But Budapest is beautiful in all weathers.

The level of music-making in Hungary is so high that the festival needn't spend much hard currency on international names for window-dressing. Plenty of native musicians have international names, and the festival also welcomes back emigrants—10th Hungarians live in Hungary, 15th abroad—like Csiffra and György Sándor. Bartók and Kodály figure large in the programmes, and this year Ligeti, too, and amid familiar Western fare, one expects a special idiomatic grasp in the playing of national masterworks, and one isn't disappointed.

There are even more Bartók masterworks, for example, than is generally realised and one of them is the first op. 10 "Image" with which the Hungarian State Symphony began their last festival concert. Its title translates uncertainly as "Blossoming" or "In full bloom," but its heady fragrance is as direct and potent as Dvořák's high-summer imagery: expectantly still, teeming, fructuous, charged with an impersonal eros in burning-point. It is a chain of woodwind solos (over impres-

sonist strings) in which speaking inflections make all the difference, and there was pure pleasure in hearing them so instinctively shaped.

It was hard to guess how much was prompted by the conductor János Sándor, and how much he merely presided. In Bartók's second and third piano concertos he had György Sándor (no relation) as his imperious soloist and was content to follow him. There was too little even-handed dialogue between piano and orchestra, with a consequent loss of cumu-

lous Bartók Bluebeard, was young and tender in his solos; young János Kuty, perhaps flattered by the deep acoustic, sounded ravishing in the soprano movement.

The festival collaborates with other state organisations in running an annual International Composers' Competition, with the prize-winning works guaranteed publication and festival performances the next year. The 1982 competition prescribed string quartets; no first prize was awarded, but a second and two thirds went to youngish

crackling scherzo played mostly with pencils-and-rubbers and bursts of the Hong Kong folk-pop of the composer's childhood—more sweet than sour-mewed in unison. The smiling innocence of this cross-cultural marriage was astonishing and all surely imagine the traces of calculation on paper. The composer is 34; heaven knows what he will do next. The 1984 competition, by the way, prescribes piano trios.

The festival concluded—as it will next year too—with a recital by Georges Cziffra, in the big Erkel Theatre to accommodate the excited crowds. Cziffra has lived in France these many years, where his hair-raising autobiography has just been published. We do not hear him in Britain: there is a story about his last Festival Hall appearance which, if true, would explain that entirely, but we miss him all the same.

His virtuoso fingers are intact, as also his trick of starting unabashed into the audience for approbation in mid-flight. There is a new serenity about his playing, still with a whiff of the sulphurous and the feroceous. Liszt's Second Polonaise was electrical, but two Schubert Impromptus sang angelically. If the Third Ballade of Chopin suggested that Cziffra's sheer immediacy denies him a really large-scale reach, the Polonaise-Fantaisie proved him to have visionary powers well beyond keyboard-ionery.

Musicians who enjoy a break before Easter should remember Budapest. Next year's Spring Festival is cut to the exact shape of the one just past—a case of general satisfaction with the formula, no doubt. I should be the last to demur, though Western-style programme-notes would be an improvement; for the German Requiem we weren't even given the number of movements.

David Murray tells music-lovers where to go one of these Easters

lative drama (especially in the Second), but in Bartók's piano idiom Sándor's credentials are beyond question and the plain piano-playing—tough, pithy, stringent—was a lesson.

That concert was held in the main hall of the Zeneakadémia, the Academy of Music, which has the old-fashioned warmth of a mini-Concertgebouw. I missed any concert in Pest's newly restored Vigadó (the old acoustic is said to have been too faithfully recaptured), but across the Danube in Buda the German Requiem of Brahms expanded graciously in the grand Matthias Church. Much rebuilt, it suggests Beethoven to Byzantium—the Turks held Hungary for a century and a half, and their influence has been happily assimilated.

Ervin Lukács led the Radio Choir and Budapest Concert Orchestra in a performance of loving breadth, much less aware than present convention dictates over here—the Brahms of the Requiem was in his mid-30s, after all, with the Four Serious Songs almost 30 years ahead. György Melis, a re-

nowned Bartók Bluebeard, was young and tender in his solos; young János Kuty, perhaps flattered by the deep acoustic, sounded ravishing in the soprano movement.

The festival collaborates with other state organisations in running an annual International Composers' Competition, with the prize-winning works guaranteed publication and festival performances the next year. The 1982 competition prescribed string quartets; no first prize was awarded, but a second and two thirds went to youngish

Chinese-Canadian, Russian and Hungarian composers for music of vividly individual character, duly premiered last month in the smaller Zeneakadémia hall.

Alcina/Elizabeth Hall

Stanley Sadie

London Handellians loyal to the Handel Opera Society could hear on Saturday a concert performance of Alcina. The familiarity of this "magic opera," whose music is as spectacular as its story, is merited. The HOS has staged it twice and two other productions have been seen at Covent Garden; there have been concert versions and there is a Sutherland recording. Understandably, anyone prefers to revive a good, popular opera rather than a doubtful, lesser-known one; but perhaps the HOS choice was ill-considered.

For a start, no concert version can be near to complete;

the programme claimed modest cutting, but seven arias went and 10 were done at less than half-length. Second, it needs not just a good cast but a superb one. Third, the performance regaled in its stylistic stance, the revivals of 10 or 20 years ago and—as indeed Charles Farncombe knows—things have moved on.

It is not just a matter of period instruments, though they help by inducing a more apt manner of articulation. The performance was earthbound partly because much of the orchestral playing was artless and heavy; bow too adherent to strings, overmuch vibrato. Probably it was cautious be-

cause it was under-prepared, for one noted with dismay that the same arbitrary reorchestration was used in the overture and dances as in the society's earlier days, when people still felt that Handel needed improvement.

Otherwise, Mr Farncombe piloted the performance with a careful hand and tempos were sane and considerate. Of the cast, the most experienced Handelian was Wendy Eathorne, who showed her paces in a brilliant account of Morgana's "Tornami a vagheggiar," light and agile, with ringing high notes. Alcina was sung by Penelope Wilmsey-Clark, not with quite enough intensity or feeling for words and meaning.

yet there is dramatic edge and a gleam to the tone that promise well. The scena ending Act II had vivid moments.

Cynthia Buchanan made a strongly focused Bradamante with plenty of vitality though tending to match at the divisions. Ruggero, composed for a high castrato, was the alto Robin Martin-Oliver, whose voice rises best above top C, where most altos fade; the bottom is slender. His brilliant arias went well, but the role's heart lies in the expressive ones, especially "Verdi prati," and these were cool. Glenn Walslade provided a pleasingly graceful if over-vibrant tenor and Eric Roberts was the warm baritone.

Music for 'Alceste' / St. John's

Max Loppert

Late in life, Handel foresaw opera and oratorio for an unfamiliar brief venture in the composition of incidental music for a play. The drama was Tobias Smollett's *Alceste*, intended for Covent Garden in 1750; for reasons that remain unclear its performance never took place. The play is lost; but though Handel, with his customary good housekeeping, the *Alceste* score survives and was given a rare concert performance at Smith Square on Saturday by the Academy of Ancient Music.

The music is, of course, mature Handel; all of it is worth reviving and some of it is wonderfully beautiful. The score seems not to have run continuously, but to have provided substantial episodes, functioning perhaps as diversions, within the play. After an overture, there follow the celebratory sequences of Act 1, the *Alceste* and *Elysium* passages of Act 4, then a second and final celebration.

It is hard to work out just how the score and the play were intended to mesh together, but that need not take delight in the music as it remains. Two of the solo

numbers, a sleep song for the muse Calliope (most delightfully and poetically delivered by Emma Kirkby) and Charon's alarmingly vivid "Ye fleeting shades" (pawily sung by David Thomas), are of extraordinary graphic quality—Handel's "supreme attributes of the musical dramatist" (as the New Grove deems them) are no less strikingly evidenced in these tiny gems than in his most famous operatic invention. The celebratory sequences, including two lyric arias for early William Kendall, are less remarkable, but not less masterly.

The Academy and its director, Christopher Hogwood, placed the *Alceste* music on disc a couple of years ago with some of Saturday's singers. Obviously, there is a fund of enthusiasm for the revival; unlike in some Academy performances of recent memory, that enthusiasm was translated into playing and singing of incandescent charm. Not just clearly articulated (and well-tempered, apart from some oboe squawks) but sharply and communicatively projected. Singers' words, Miss Kirkby's and Miss Thomas's excepted, were unclear that was only a tiny blot on the evening's pleasure.

Christian Zacharias/Wigmore Hall

David Murray

Another welcome series of Sunday Morning Coffee Concerts began yesterday at the Wigmore with a piano recital by the 33-year-old German pianist Christian Zacharias. Fresh from his South Bank performance of Mozart's last concerto, a tightly thought-out and appealingly honest, he played Schubert and Schumann.

His Schubert was the nocturne A major Sonata, D. 664. He brought some of his Mozart virtues to it, aptly enough; it danced easily, at impossible tempi and with an air of almost-artless simplicity. The Zacharias touch is firm and a little dry, and though it was lubricated for Schubert with a great deal of pedal—that is becoming

sensitive, lively, bien recherché—each small piece was stamped with definite ideas; sometimes doubtful, always clear-cut. The wild final "March" never really threatened to go off into the frantic spiral it aims at. In this hall, the Zacharias fortissimo was a stiff-fingered, unwieldy sound.

Cheltenham Festival plans

This year's Cheltenham Music Festival will run from July 2 to 17. Among the artists appearing are Dame Janet Baker, Alfred Brendel, the Gabrieli Quartet, James Galway, Yehudi Menuhin and Vladimir Ashkenazy; Brahms' sonatas for violin and piano (Tue), Theatre des Champs Elysees (724777). Ensemble Orchestral de Paris with Jean-Claude Pennetier as conductor and soloist: Haydn, Janacek, Schoenberg (Tue), Sala Gaveaux (563300). Orchestre de Paris conducted by Daniel Barenboim with Maurice André, Beethoven, Haydn, Elgar, Scriabin (Wed, Thur), Sala Pleyel (563878). Markella Nordmanns harp recital (8.30pm) Bruno Paugliese—composition for an alto (8.30pm); traditional Latin American music (10.30pm) Thursday all three concerts. Opera Comique (586011).

ing trombonist Curtis Fuller and drummer Billy Higgins. Marilyn Horne recital (Mon) TWP - Chatelet (2611883). Joey Van Dam recital (Mon) Theatre de l'Athene (742572). Alfred Brendel, piano: Beethoven sonatas (Tue), Sala Pleyel (563878). Juhász Péter and Vladimir Ashkenazy: Brahms' sonatas for violin and piano (Tue), Theatre des Champs Elysees (724777). Ensemble Orchestral de Paris with Jean-Claude Pennetier as conductor and soloist: Haydn, Janacek, Schoenberg (Tue), Sala Gaveaux (563300). Orchestre de Paris conducted by Daniel Barenboim with Maurice André, Beethoven, Haydn, Elgar, Scriabin (Wed, Thur), Sala Pleyel (563878). Markella Nordmanns harp recital (8.30pm) Bruno Paugliese—composition for an alto (8.30pm); traditional Latin American music (10.30pm) Thursday all three concerts. Opera Comique (586011).

na. Schoenberg, Liszt, Debussy (Tue); Zubin Mehta conducting Gidon Kremer, Kim Kashkashian, viola, Mozart, Bruckner, Avery Fisher Hall (5742424). Boston Symphony: Solti Orchestras conducting: Hildegard Bebanova soprano, Kim Kashkashian, viola, Mozart, Strauss (Wed, Thur), Carnegie Hall (2477459). New Music Consort: Worcester: Trip for Brass Instruments (world premiere), Lundborg: Ghost Sonata (world premiere), Boulder, Bend Davidovsky (Thur), Carnegie Recital Hall (2477459).

Alcina Tully Hall; Maurice Bourge oboe, Richard Goode piano. De-mersmann, Mozart, Schumann, Brahms (Mon, Tue); Benita Valente soprano, Cynthia Rahn piano, Bach, Schubert, Strauss, Ravel, Wolf (Thur), Lincoln Center (3821900).

CHICAGO

Chicago Symphony: Sir Georg Solti conducting, Wagner (Thur) Orchestra Hall (4558122).

VIENNA

Musikverein (858190): Mirella Freni, soprano, Pavarotti, Verdi, Duparc, Strauss, Brahms (Mon, Tue). Konzerthaus (721211): Natalia Gutman, Cello, Elzino Wirsaladze, Piano, Grieg, Mendelssohn and Prokofiev (Mon); Vienna Symphony Orchestra, conductor Christoph Eschenbach, Natalia Gutman, Cello, Beethoven and Shostakovich (Thur).

NEW YORK

New York Philharmonic: Zubin Mehta conducting, Krystian Zimerman pi-

Arts Guide

Music/Monday, Opera and Ballet/Tuesday, Theatre/Wednesday, Exhibitions/Thursday, A selective guide to all the Arts appears each Friday.

Music

LONDON

London Concert Orchestra and Chorus conducted by Richard Hickox with soloists including Felicity Palmer and Norman Bailey, Elgar's Dream of Gerontius, Royal Festival Hall (Mon), (9283191). Yana Milanova, violin and Elizabeth Vanya, piano: Beethoven sonatas, Queen Elizabeth Hall (Mon), (9283191).

Royal Philharmonic Orchestra conducted by Walter Weller with Janet Baker, mezzo-soprano, Wagner and Mahler: Royal Festival Hall (Tue).

London Concert Orchestra conducted by Harry Rabinowitz with Malcolm Binns, piano, Russian programme, Barbican Hall (Tue), (5388061).

Philharmonia Orchestra conducted by Bernard Haitink with Zora Neisova, Elgar, Royal Festival Hall (Wed).

London Sinfonietta conducted by Anthony Pay, Oliver Knussen, Simon Birchall and others, Queen Elizabeth Hall (Wed).

English Chamber Orchestra conducted by Norman del Mar with Oscar Shumsky, violin, Rossini, Mozart, Saint-Saëns and Beethoven, Barbican Hall (Wed).

London Symphony Orchestra conducted by Andre Previn with Yuzuko Horiguchi, violin, Mendelssohn and Prokofiev: Royal Festival Hall (Thur).

Lontana, directed by Odaline de la Martinez with Mary King, mezzo-soprano and Nigel Rogers, tenor, Payel Room (Thur), (9283191).

Rennie Scott's, Frith Street Pianist Cedar Walton leads a quintet, includ-

ing trombonist Curtis Fuller and drummer Billy Higgins.

PARIS

Marilyn Horne recital (Mon) TWP - Chatelet (2611883).

Joey Van Dam recital (Mon) Theatre de l'Athene (742572).

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ITALY

Rome: Auditorium via della Conciliazione: Grunz Gelber, piano, Shostakovich and Brahms (Mon and Tue).

Rome: Auditorium Foro Italico: Ugo Ughi, piano, Beethoven and Schubert (Wed and Thur).

NEW YORK

New York Philharmonic: Zubin Mehta conducting, Krystian Zimerman pi-

F.T. CROSSWORD

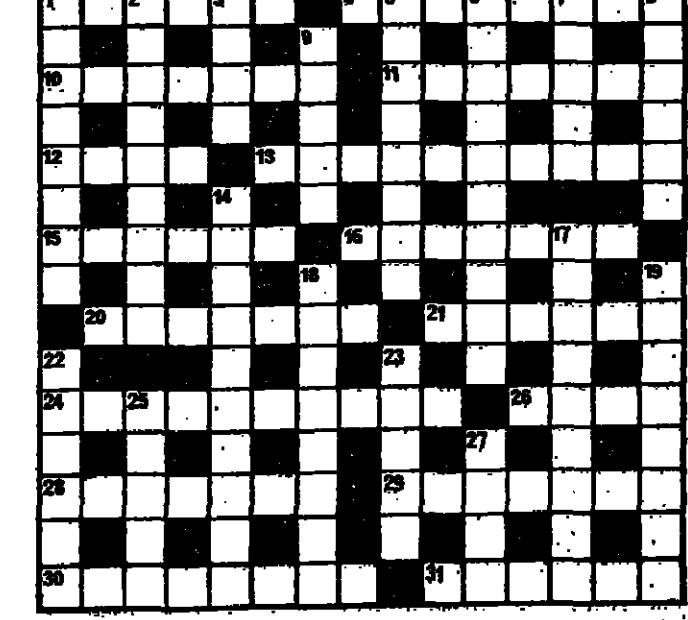
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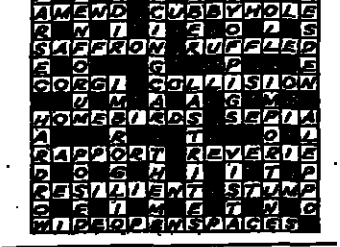
- 1 Get mother to request the fabric (6)
- 4 Great victories off the coast of Kent (8)
- 10 The girl has a setback with the payments (7)
- 11 Man governed by the body (7)
- 12 It is lost if they have it (4)
- 13 Rung twice to tell of good news (6, 4)
- 15 Drags behind the beaten paths (6)
- 16 Charles is about to lease the cottages (7)
- 20 The Saint we leave for the North (7)
- 21 African soldier has to request change of air (6)
- 24 This is what gets a team down (10)
- 26 Confusion where people eat (4)
- 28 Where sailors used to get a suspended sentence (4-3)
- 29 Type of relief for the handicapped (7)
- 30 "On the — Djin" (Sorcerer) (8)
- 31 Private eye who used little grey cells (6)

DOWN

- 1 Lifeless, crazy, but most enthusiastic (4, 4)
- 2 She was named after a waterfall (9)



Solution to puzzle No. 5,141



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Monday April 11 1983

Moscow and the Press

THE SOVIET leadership and its officials have an unhappy knack of giving themselves away. The expulsion order against Mr Anthony Robinson, the Moscow correspondent of the Financial Times, is yet another display of this talent.

Mr Robinson was accused of engaging in "unacceptable activities" with no further explanation offered. In Soviet officialdom that can mean just about anything that is not to the liking of the officials. The phrase in this case also echoes the reason given by the Foreign Office in London when, on March 31, it ordered a Soviet journalist out of the country.

This echo clearly identifies the expulsion of Mr Robinson as a straightforward reprisal, not to say an act of spite. He is being thrown out not for unacceptable activities in any honest sense of these words, but because Britain has expelled as a spy Mr Igor Titov, London correspondent of New Times, the Moscow weekly.

Every country has the right to expel spies, provided they are spies. It is quite another matter for Moscow to start a game of tit for tat of which nobody can say where it will end. The recent unmaking and expulsion of groups of alleged Soviet spies in Britain, France and Spain offers Moscow, if it so wishes, plenty of opportunity to play this dangerous game. Doing so would do nothing for the reputation of Mr Yuri Andropov and his new regime in the Kremlin.

Retaliation

Moscow's retaliatory action against Mr Robinson is a flagrant breach of the Final Act of Helsinki signed in 1975. In that document the Soviet Union, the other European states, Canada and the U.S. undertook to improve conditions under which foreign correspondents work in each other's countries. The relevant passage says: "The participating states reaffirm that the legitimate pursuit of their professional activity will neither render journalists liable to expulsion nor otherwise penalise them."

That should be clear enough: gathering and publishing information is a legitimate activity. But Moscow sees it in a different light. The role of the data protection Bill, which starts its second reading in the Commons today, will be the subject of fairly strenuous attack.

Although its ostensible purpose is to reassure us all, on the eve of an electronic 1984, that computers will not be allowed to use their endless memories and effortless ability to traffic information against the interests of our liberty, a Bill which takes so little trouble to conceal its vast loopholes forms an easy target.

The Opposition will brand it as the third leg of a triangle of repressive law—the police Bill and the Nationality Bill being the others—to have been conceived by Mr Whitelaw's Home Office this Parliament.

The British Medical Association, one of several special interest groups to be worried about the Bill, sees it as another indication of Government willingness to place a higher priority on police power than other principles such as the confidentiality of medical record-keeping.

Access

The Bill's main provision is to require all those who store information about individuals inside computers to register with a data protection registrar and to state for what purpose the data is held and to whom it might be made available.

Individuals who believe themselves to be in a data bank may then, on payment of a fee, demand access to their electronic file and where appropriate go to court to insist upon the correction of inaccuracies and to seek compensation.

As one would expect, however, broad exemptions have been granted from this central provision. Right of access does not apply to records concerned with national security or material "likely to prejudice the prevention or detection, the pursuit of offenders, tax gathering, immigration, or the administration of justice."

From one important point of view however the Bill is reservedly welcome. It will,

Soviet journalist is very different from that of his western colleagues. In the Soviet Union the journalist is expected to support the system and to put over its viewpoint.

Resentments

With such an attitude the Soviet Union has at all times had difficulties in accepting the role of the western journalist whose first duty is to report facts as completely as possible. Resentments against foreign correspondents have often been aroused in Moscow, it is not unusual for them to be submitted to harassment.

Moscow's secretiveness can be attributed to a defensive attitude rooted deeply in Russian history. It goes back to a time well before the Communist revolution of 1917. By clinging to it and restricting foreign correspondents (as well as its own journalists) the Soviet leadership is rendering itself a disservice. Recent changes under which the Soviet press may report the existence of certain grievances and inefficiencies point in the right direction; but there is a long way to go.

Foreign correspondents still face great difficulties in providing a full reporting service. Their access to information is limited, even though, as Mr Robinson has shown, it is possible to do an outstanding job against the difficulties. If the difficulties are now to be increased, Moscow must be prepared for a heavy loss of western confidence.

Kremlin leaders do not usually pay much attention to public opinion in the West, but they are more sensitive to a moment when Mr Andropov is trying to sweep away the many cobwebs that hamper Soviet society and, in particular, the Soviet economy. The overdue modernisation of Soviet industry requires commercial exchanges and wider co-operation with the West.

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BY A nice irony, New Delhi, resplendent with monuments to Britain's imperial past, will be the scene this summer of talks which may critically influence the UK's hopes of reversing a quarter-century of steady retreat from the world telecommunications market.

Britain is in the final stages of a campaign to persuade Indian authorities to choose System X, the UK's all-electronic digital telephone exchange, as a major component in the modernisation and expansion of their national telecommunications network.

The Indian contract, for which GEC is bidding against almost a dozen international competitors, would be worth around £100m, with the prospect of more orders later. Plessey also hopes to sell India rural exchanges worth £20m. But large as they are, the prospective orders cannot be measured only in terms of cash.

System X, which is just entering volume production, was conceived at the outset as an internationally saleable product, as well as the mainstay of British Telecom's own network. But so far, it has made only one small overseas sale, worth £2m, for an exchange to be installed by Cable and Wireless on the Caribbean island of St Vincent.

If it is to gain a worthwhile share of overseas markets, it needs a large foreign "reference" order soon to help establish its international credibility. The government appears prepared to back the Indian bid with bilateral aid worth several tens of millions of pounds.

Financial inducements are common in international telecommunications deals, where politics, financing terms and trade concessions often count for more than the specifications and price of equipment. They are particularly important now, as more than a dozen North American, Western European and Japanese manufacturers battle for survival in an overcrowded market.

Some, like the Dutch Philips group, Europe's largest elec-

tronics company, have already concluded that the stakes are too high to continue alone. Philips is planning its future in public telecommunications to a planned joint venture with American Telephone and Telegraph, which is seeking to expand outside the U.S. for the first time for half a century.

Philips is also collaborating with France's CIT Alcatel in private equipment. Others may soon be forced into similar arrangements. Some industry experts forecast that by the end of this decade, the number of telecommunications companies able to support a full range of products on their own will be reduced to half-a-dozen or less.

The costs of developing new public exchanges have soared into the same league as for commercial airliners. International Telephone and Telegraph of the U.S. says that developing its new System 12

best part of a decade, in which ideas for the design of System X were chewed over at length. But while British manufacturers were talking, several foreign companies, notably Canada's Northern Telecom, Sweden's L. M. Ericsson and France's CIT Alcatel, were getting on with the job of bringing competing exchanges to the market.

Hopes that the collaborative System X effort would enable Britain to catch up quickly were soon disappointed. With no overall taskmaster, the project began to drift. Delays, mounting costs and other problems aroused bitter mutual recrimination. "It ended up with everybody trying to protect a vested interest," according to a senior executive of one manufacturer.

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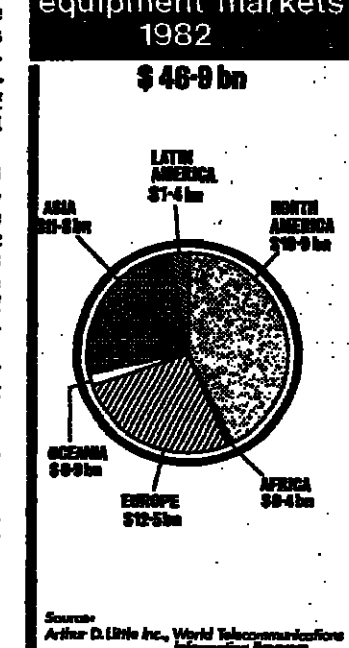
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Telecommunications equipment markets 1982



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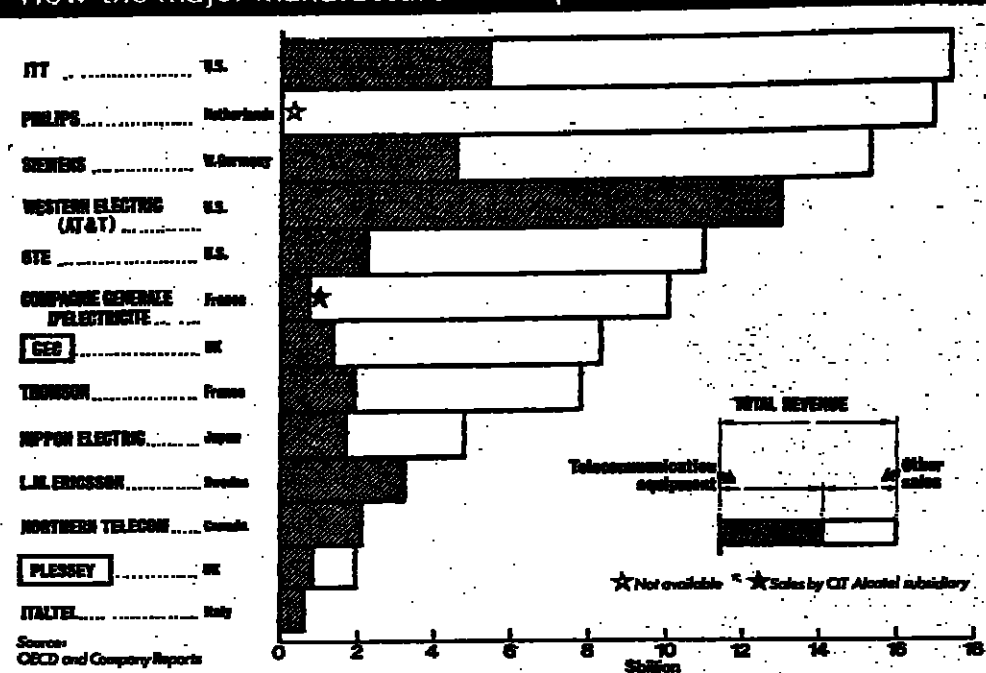
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UK TELECOMMUNICATION EXPORTS

A crucial test for System X

By Guy de Jonquieres

How the major manufacturers compare 1981 sales



equipment has cost about \$1bn. British Telecom (BT), which has paid for all the System X programme so far, admits to spending about \$300m, with more still needed to see the exchanges into full production. BT recently reduced its exposure by placing all further development on a fixed price basis with GEC and Plessey, which will have to cover any cost overruns out of their own pockets.

Behind these massive budgets lie a sea-change in technology. The latest digital exchanges are powerful special-purpose computers, in which banks of microchips replace all mechanical parts. They can be programmed to provide many additional services, such as redialling and rerouting calls automatically or controlling household security systems.

The real expense is not in manufacturing, where costs and manpower levels have fallen dramatically. It lies in employ-

ing armies of skilled designers and engineers to create the thousands of complex computer programs needed to make them work. Because digital exchange designs are tied to the inexorable progress of microelectronics, they must also be continuously updated to remain competitive.

It is generally accepted that manufacturers with less than 5 per cent of the world market for public exchanges, currently worth about \$10bn a year, will have difficulty surviving. That apparently modest share may be hard to attain, however. Traditionally, only a quarter of the world market has been open to free competition. Much of it is in the Third World, where problems of infrastructure and

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Systems, estimates that of the \$1.5bn market, likely to be available to System X in five years time, only 10 per cent will be outside Britain and the U.S.

Little of the business will be in direct exports. It's Cash 22," says Mr Pitcher. "The only big markets are those which also insist on making the products themselves." That means that suppliers must make most of their money by setting up local plants, technology transfer, system planning, consultancy and training.

Competition to get in at the start of big telecommunications projects is fierce. The initial contracts are often the key to much bigger follow-on orders.

CIT Alcatel grabbed a large slice of India's telecommunications project last year—even before tenders from the other bidders were opened—thanks to a back-door deal between the French and Indian Governments. Japanese companies are widely accused of "lock-in-ing" at cut-throat prices. And several suppliers are seeking customers for digital exchanges which still exist only on the drawing board or as prototypes.

Mr John Whyte, BT's engineer-in-chief and proponent of System X, says that it is technically as good as any of its rivals such as Ericsson, which is over-engineered to suit UK standards. BT hopes that foreign sales will provide economies of scale which will reduce the price it pays for System X.

Without overseas orders, it must be asked whether the \$300m which British telephone subscribers have already stumped up for System X development can be justified in strict business criteria. When BT will have brought similar technology more cheaply from abroad.

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Men & Matters

Apple juice

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EMPLOYMENT WILL CONTINUE TO FALL IN MANY SECTORS, SAYS REPORT

Bleak jobs forecast for Britain

BY JOHN LLOYD, LABOUR EDITOR, IN LONDON

THERE IS no prospect of an increase in jobs in any of Britain's major industrial or service sectors before the end of the decade, according to a report which is to be presented to government, industry and union leaders today.

The report says that in many areas employment will continue to fall. It also warns that over the same period import penetration is likely to increase while the UK's export competitiveness should decline - unless government and industrial policies undergo a fundamental change.

These exceptionally gloomy predictions are contained in a confidential memorandum by Mr. Geoffrey Chandler, the director of the National Economic Development Council (NEDC) which is to be discussed at today's council meeting. The report draws together the assessment - prepared over the past year - of the NEDC's 40 sectoral committees of trends for the medium and long term.

These sectors cover the groupings of consumer markets, manufacturing plant components and systems, industrial intermediates (such as steel and chemicals) and project engineering, infrastructure and public services investment and commercial services investment. Trends in the few groups not covered by NEDC sector committees - such as vehicles - are not

thought to show major differences from those covered.

Detailed statistics in the memorandum show declines in employment in all the sectors reporting over the 1975-81 period; increases in import penetration in all but a few, such as food, brewing and agriculture in the same period; and a drop in Britain's share of OECD countries' exports in many sectors - such as electronic consumer goods and capital equipment, office and construction equipment, machine tools, iron and steel, wool textiles and wine and spirits, between 1975 and 1980. These trends are not, in the main, expected to be reversed.

The memorandum will fuel demands from the Trades Union Congress and some industrialists for a large-scale shift in government policy - especially in the direction, implied in the paper, of increased government assistance and import ceilings in some sectors. The paper also stresses a number of major problems common to all sectors, including:

● A drop in employment, especially in mature industries (textiles, iron and steel, mechanical engineering, for example) but also including growth industries such as electronics because of changing production techniques and improved productivity.

● None of the committees which have reported foresees an increase

in employment in its sector up to the end of the decade; continuing productivity improvements will be needed in order to maintain sectoral competitiveness, and many committees expect further reductions in employment to take place.

● A lack of skilled personnel in the electronics sector, and general concern over the drop in university and polytechnic places for undergraduates specialising in high technology subjects.

● The provision of technical and vocational training in the UK does not... yet approach that of major competitive countries, and this must be a matter of concern, when the nation's future will depend on innovation, adaptability, design, quality and a range of other factors, all of which are skill-dependent.

● A low level of investment in the past, ascribed to lack of demand and profitability and to high and varying exchange, interest and inflation rates. This is acknowledged to have improved, but the report says that "if British companies are to be able to compete over the next decade, financial institutions will need to show a clearer understanding of risk/reward ratios and the time scale of risk in high technology projects."

● The crucial factor of application of new technologies, especially in automated production processes,

has been aided by government schemes - but more co-ordination between government and industry, especially in electronics, is urgently required. "The total expenditure on civil R and D is still much less than that of our major competitors, and there remains scope for a more effective balance of expenditure in favour of industry-based products."

● Structural change has been rapid, but over-capacity continues to be an international problem in some sectors. The memorandum says that restructuring must also be international; "otherwise, UK companies may be forced to retrench beyond the point of economic viability."

Further structural change is expected, especially in engineering, to achieve the size of company, market capability and financial resources sufficient to support investment in modern equipment and enable the development of world market strategies. The consequential specialisation could, however, lead to a permanent reduction in capacity or to the elimination of parts of some engineering product sectors in the UK altogether.

● Government's role is generally thought of as being too limited. A number of committees, especially in the consumer sector, argue for selective import controls, and most argue for lower energy prices, stable interest and exchange rates, and an increased level of demand.

Rolls cuts U.S. car prices by up to \$18,000

By Richard Lambert in New York

THE PRICE of a Rolls-Royce car in the U.S. is to be cut by between \$4,000 and \$18,000 - the equivalent of roughly three Honda Civics.

As a result, the price of the Silver Spirit - the cheapest car which Rolls sells in the U.S. - is coming down from \$111,000 to a modest \$93,000, a bargain which is expected to send Texan billionaires and Hollywood film stars stampeding into the showrooms.

The price cut, which has been made possible by the falling value of sterling against the dollar, comes after a poor period for the UK car company's sales in the U.S. Most luxury cars sold surprisingly well in the U.S. last year - Cadillac's business rose by over a tenth, for instance, while Mercedes rose by 7 per cent to over 62,000 vehicles. But retail sales of Rolls-Royce cars in the U.S. fell by over a fifth to just 908 vehicles.

Mr George Lewis, president of Rolls-Royce Motors Inc., the U.S. arm of the company, said that the strength of sterling prior to the collapse in the oil price had helped to push Rolls prices out of line in the marketplace. Traditionally, the car cost about 3½ times the price of the most expensive Cadillac and about 50 per cent more than the priciest Mercedes. "We do well on that kind of relationship," he added.

Recently, however, the car has been selling at more than four times the price of a Cadillac and at about twice that of a Mercedes.

Although unit sales fell sharply in 1982, the actual dollar value of Rolls' wholesale business in the U.S. rose modestly during the year to \$101m. "Affordability is the issue," Mr Lewis explained. "Anyone would buy it if they could."

All the same, the decision to cut the price of a status symbol is not one that could have been taken lightly. "It's anything but an everyday occurrence," Mr Lewis admitted.

In the past year or so, Rolls has been taking advantage of the weakness in sterling by making discreet offers of incentives to its dealers. As it did not wish to keep changing the retail price, it wanted to see how far down sterling might go before making a public announcement.

Assuming Rolls dealers use anything as vulgar as a price tag, they can now point to what in money terms must surely be the biggest price cut in automotive history.

Mr Lewis said he was "cautious" about the sales outlook following the change. He added that Rolls sold 100 cars a month in 1976, which he said was the last occasion on which it was in the present price relationship with its competitors.

Controversy over census

Continued from Page 1

ture (which needs no names) and "filling gaps in the register of inhabitants" (which does). The Interior Ministry has promised that the names will be separated from the answers and destroyed, and that the special "data protection" unit at the ministry will prevent misuse of the answers by police and other authorities.

But the city council of Munich has already offered census takers DM 2.50 for every non-registered person they find and double that amount for finding a foreigner.

Germans, like everyone else, usually have something to hide even if it is just an extra bit of rent not declared to the tax authorities. But even the blameworthy will find that the authorities have devised a form that fits no standard German envelope and Frau Müller, the public-spirited census taker from the corner shop, will be able to confirm what she had always suspected: that Signa buys her leg-warmers out of dole money and young Holger lives with a friend.

THE LEX COLUMN Open season for takeovers

Corporate takeovers are back in high fashion in Britain. Already last year acquisitions and mergers in the UK were picking up strongly, with total expenditure in cash and shares doubling to £2.2bn. One unequivocal indication of increased activity emerged in January with talk of the Monopolies and Mergers Commission being overburdened. Its investigations then, involved, among others, brick manufacturer Itstock Johnson, for whom both London Brick and Redland had bid; Fitch Lovell, on the receiving end of a Linford offer; and Anderson Strathclyde, at whom Charter Consolidated had directed its sights.

The Anderson/Charter merger has now gone ahead, while Redland withdrew its bidstock offer on Friday. But the commission's respite may be brief, at least to judge by recent moves among quoted companies. Quite apart from the UDS bid battle, in the last fortnight Hepworth Ceramic has lured for Steeley, while on Tuesday BTR made an initial move for Thomas Tilling with a dawn raid.

In part the revival of activity may reflect the weakness of sterling. From 1979 to 1981 acquisition-minded UK companies were taking advantage of the low level of the dollar to buy up U.S. assets. Among the most aggressive purchasers were Grand Metropolitan, Hanson Trust, Unigate and the Imperial Group. The transformation of the currency position has redirected predators' attentions to the UK. Many potential UK victims anyway, possess extensive U.S. interests, Tilling being a case in point.

More important is the high level of the London equity market. On a declared tax basis the health and household sector's p/e is now 24, for instance, while that for electricals is 18. But high ratings have been awarded on a very selective basis, producing what has been dubbed a two-tier market. For a company in the first tier, the cost of buying a

second division company with paper must appear cheaper than for many years.

In recent months, valuations have started to converge. According to stockbrokers Wood Mackenzie, prices of the top 30 stocks by capitalisation in the industrial group were virtually unchanged in the first quarter, after rising by 43 per cent last year. By contrast, recovery stocks - defined as those which have cut their dividend in the recession - outperformed the FT All-Share index by 15 per cent in the first quarter after underperforming by 20 per cent in 1982.

Targets

So the range of p/e ratios is beginning to narrow, more as prices of first-tier stocks stand still than as those of second-tier companies rise - since these rises have been matched by profits recovery. At the same time predators are probably looking at better results from their own operations. As a consequence they aim to buy in more growth potential before the stock market valuations of possible targets has adjusted. Redland's withdrawal of its bid for UDS bid seems to be tacit acknowledgement that it has struck too late to obtain a pre-recovery price.

Bid currency need not be confined to paper. Many companies have succeeded in building up healthy cash piles. Indeed, corporate gearing is particularly low. On stockbrokers' Phillips and Drew's assessment net debt of the average industrial and commercial company may be about 17 per cent of equity, compared with a normal 18 to 28 per cent range. Anyway, abundant institutional liquidity makes it easy for companies to raise cash. In such an environment, it becomes easy to offer an attractive package of cash and shares when making a bid.

It is noticeable that recent takeover moves have involved a number of stocks closely related to the building sector. Itstock and Steeley are obvious examples, while Tilling has a substantial proportion of its interests in this area. In contrast to some of the troubled engineers, which face foreign competition and a rapidly changing market place, building related equities should enjoy a more reliable upturn in an economic recovery.

The other sector to have seen abnormal activity is retailing. House of Fraser continues to be stalked by Loungh, the UDS battle is at a climax and Woolworth has found new owners. A common theme is the attraction of buying retailing property assets at a discount to valuation. While such considerations may be an unreliable measure of profit potential, prospects of predator action have sparked a re-rating of several of the poorer performing stores groups on the basis of asset backing. In other sectors too, troubled or dull - but asset-rich - companies have been boosted. In the last two months Barmah's price has risen 30 per cent compared with a 5 per cent increase in the All-Share. Rank is up 18 per cent and BET 25 per cent.

The institutions are much less trigger-happy when it comes to accepting offers. In sharp contrast to the heyday of dawn raids, when a company could pick up 20-30 per cent of anyone for a reasonable premium, BTR managed to trail only 6 per cent of Tilling last week. But this is likely to reflect the experience that still higher prices emerge later with - or even without - a full bid. Meanwhile the rhetoric of takeover deals often concentrates on management performance, against which defences based on dividend rises and property revaluations may have only limited impact.

At this stage in the cycle any company that cuts its dividend - as Bowater has just done - must be paying particularly close attention to its shareholder register.

Tory push on UK data protection legislation

By Ian Hargreaves in London

BRITAIN'S Conservative Government will step up its effort this week to win early parliamentary approval of data protection legislation which it believes will enable the UK to ratify the European convention on data protection.

This would finally remove from British-based companies the threat of being barred from moving electronic data to and from other European countries because of inadequate UK controls on computer records.

The Government hopes that the Data Protection Bill, which starts its second reading in the House of Commons today, can be enacted by the summer recess. It has already been in the House of Lords.

The Labour Opposition, however, plans to introduce a series of amendments to broaden the scope of the legislation.

The bill's main provision is to establish a data protection registrar who, with a staff of about 20, will take details from an estimated 80,000 holders of personal computerised records about the purpose of these data banks and about the people to whom their contents are accessible.

The bill creates for the first time a general right for the individual to inspect his or her own computerised record, although it contains sweeping exemptions from this provision in such areas as national security, police work, taxation and immigration.

The breadth of these exemptions, along with the basic failure of the bill to cover non-computerised records, will be the subject of several Opposition amendments when the bill reaches its committee stage.

Several bodies have attacked elements of the bill, among them the British Medical Association, which argues that the bill will make it more likely that confidential medical information will be passed to the police, whose data banks are likely, for all practical purposes, to be unavailable to scrutiny.

Various legal bodies, however, have attacked the bill from the opposite perspective, on the grounds that it will offer an undesirable degree of access to certain legal files.

Editorial comment, Page 14; Law report, Page 8

New accounting proposals for Lloyd's come under fire

BY JOHN MOORE, CITY CORRESPONDENT, IN LONDON

NEW RULES for overhauling inadequate accounting standards within the Lloyd's insurance market have provoked opposition from the committee of Lloyd's, one of the ruling bodies of its insurance community.

An internal report on accounting and disclosure within the Lloyd's market is due to be published this week, and has been prepared largely at the prompting of the Department of Trade and the Bank of England, which became worried about the mounting scandal within the Lloyd's market last year. The working party which was formed to prepare the report was originally headed by Mr Ian Hay Davison, Lloyd's chief executive.

Following Mr Davison's appointment as chief executive in January, Mr Ian Plaistowe, a partner in the accountancy and auditing division of accountants Arthur Andersen took over the job.

The objection of the Lloyd's committee, formed of 18 brokers and underwriters who work in the market and which carries out executive work for the Lloyd's ruling council, centres on the amount of disclosure which should be provided by Lloyd's insurance syndicates.

The Plaistowe working party recommended that rules for disclosure of reinsurance business which Lloyd's syndicates arrange with other insurance groups to protect themselves against onerous losses should be modelled on new rules which are to be used by the Department of Trade for insurance companies.

New rules for insurance companies and their reinsurance arrangements were brought into operation earlier this year by the Department of Trade. The rules call for insurance companies to disclose the identity of reinsurers with which they do business if those reinsurers transact a material amount of business with the insurance groups. For instance, if the insurance company passes across 2 per cent or more of its premiums to a reinsurer in the form of reinsurance business, the identity of the reinsurers would be called for.

A similar proposal was suggested by the Plaistowe working party but this has been resisted by the Lloyd's committee on the grounds that it is important that reinsurance transactions remain confidential.

The other argument of the committee centres around the cost of the exercise. More disclosure, it fears, will lead to increased costs for the Lloyd's market and could place strains on Lloyd's administrative systems.

The other proposals of the Plaistowe report do not appear to have provoked such a violent reaction. In an effort to stamp out bogus reinsurance transactions within the Lloyd's market, which have led to widespread trouble in the market in the last few years, the working party has recommended that underwriters should be required to make a declaration that the premiums paid to reinsurers are commensurate with the underlying risk which is being reinsured.

Underwriters should be required to disclose their gross premiums and gross insurance claims to underwriting members, who form their insurance syndicates, rather than stating the items net of the payment of reinsurance, argues the working party. This is to ensure that members of Lloyd's can see how much of their revenues are being paid out in reinsurance.

Moreover, underwriters will have to disclose all reinsurance business which they are using for tax avoidance purposes to the Lloyd's authorities.

A rollover fund can be established with a reinsurance group offshore to reduce the level of taxable profits of underwriting members in the UK by creating a tax deductible premium cost. A contractual arrangement can be established with the reinsurer for the payment of the premium in the following year. Under this arrangement, in the event of no reinsurance claim or after the deduction of whatever claims arise the premiums are paid back to the syndicate in the following year.

The new measures of the Plaistowe working party are designed also to stamp out another practice.

Some Lloyd's underwriters use reinsurance to disguise the amount of business which they are handling in the market, laying off large parts of their own premiums with reinsurers to conceal their business volumes, and remain within business limits set down by Lloyd's.

Congress to debate bank lending

Continued from Page 1

ments have fallen six months or more in arrears will be deemed reservable, subject to a number of other conditions.

Loans "to a country unable to meet its external debt service obligations" but on which interest is still being paid will be deemed "debt service impaired," unless the country is renegotiating its obligations or extending an IMF or other "suitable economic adjustment programme."

In addition, bank examiners will be expected to comment on the general degree of the bank's country risk exposure and will consider concentration of specific risks as a factor in judging a bank's capital adequacy.

● New disclosure rules will be imposed on all banks, requiring uniform reporting of all country risks greater than 4 per cent of a bank's total assets. In addition, banks will have to report their exposures to the regulatory authorities on a quarterly basis, instead of every six months.

● Specific loss reserves will be required for loans declared "reservable" under the new risk classification. All interest payments on such loans will be used to reduce the principal or add to the reserves and will not be credited to a bank's income. The initial provision for reservable loans will normally be 10 per cent, and will be reviewed annually.

● Fees received by banks in re-scheduling agreements will be amortised over the life of the new loan, instead of being added to current income. The only exception will be for that proportion of a fee which is clearly a reimbursement of a bank's current expenses in carrying out a re-scheduling.

● The U.S. regulators will improve co-ordination with monetary authorities in other countries and with the IMF. The report calls on the IMF to comment on its member countries' banking exposures and to "consider" making these comments available to international banks and the public.

Jordan calls off PLO talks

Continued from Page 1

Saud al-Faisal, the Saudi Foreign Minister, Mr Pym made it clear that the British Government would be willing to sanction a meeting between a junior minister and a top official of the PLO.

Mr Sartawi, based in Paris, was regarded as the PLO's leading expert on European affairs. After his assassination, a letter he had sent to Herr Willy Brandt, the former West German Chancellor, who is President of the Socialist International, was read out to the delegates.

"At the centre of the Middle East conflict stand the Palestinian people with their legitimate claims to their inalienable right to self-determination, their right to establish a state of their own," the letter said.

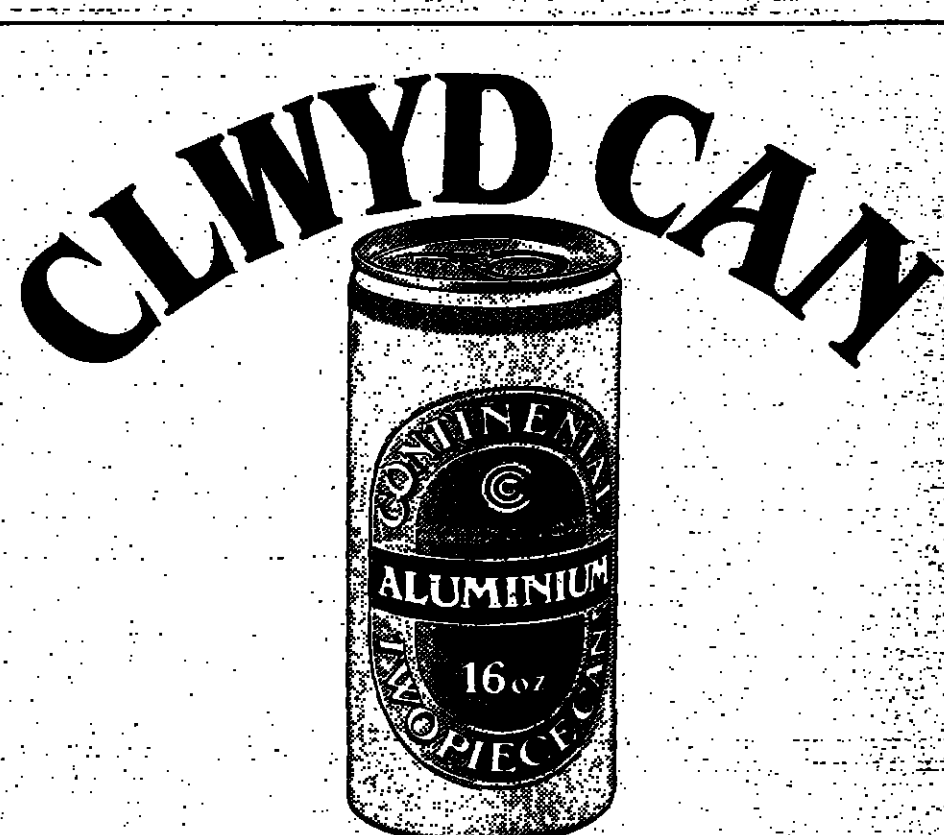
It also referred to PLO attempts to gain recognition from the Socialist International and listed examples of PLO moderation in recent years.

Mr Sartawi was often described as a roving ambassador for the Palestinian organisation and a man believed close to Mr Arafat.

He was jointly awarded a peace prize in 1979 by Chancellor Bruno Kreisky of Austria for his efforts to foster Israel-Palestine peace, together with Mr Lovya Eliav, a former secretary-general of the Israeli Labour Party. Mr Eliav said yesterday that during meetings with the PLO leader he had learned that Mr Sartawi "knew that he was in mortal danger".

The gunman, described as being in his thirties, was pursued from the hotel by security guards but escaped over a wall.

Abu Nidal, who left the PLO in 1974, has since been sentenced to death in absentia by the PLO. His followers have also claimed responsibility for last year's attempt on the life of Mr Shlomo Argov, the Israeli Ambassador to Britain.



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World Weather

Place	°C	°F	Place	°C	°F	Place	°C	°F	Place	°C	°F
Alaska	17	63	London	16	61	Madrid	21	70	Salt Lake	12	54
Algeria	19	66	Paris	15	59	Moscow	21	70	San Francisco	26	79
Amman	26	79	Rome	14	57	New York	17	63	Seattle	54	129
Antwerp	9	48	Stockholm	9	48	Oslo	17	63	St. Louis	14	57
Athens	21	70	Toronto	18	64	Washington	13	55	Tempe	24	75
Bahia	25	77	Uppsala	10	50	Wellington	13	55	Yokohama	24	75
Bangkok	29	84	Vienna	11	52	Winnipeg	10	50			
Batavia	19	66	Zurich	11	52						
Bombay	28	82									
Buenos Aires	18	64									
Calcutta	21	70									
Cairo	12	54									
Canton	20	68									
Cebu	28	82									
Colon	28	82									
Copenhagen	5	41									
Dakar	26	79									
Damascus	21	70									
Dar es Salaam	26	79									
Delhi	28	82									

Headings at mid-day yesterday.
C-Cloudy S-Drizzle F-Fog P-Fog H-Hail B-Brain S-Snow ST-Sleet T-Thunder

INTERNATIONAL CAPITAL MARKETS AND COMPANIES

U.S. BONDS

Investors nervous despite signs of lower rates

The U.S. bond market is still hoping that interest rates are set firmly on a downward track, but is waiting anxiously for official confirmation, which explained the uncertain mood of last week.

On Monday the markets marked time. The previous week's money supply figures had done little to quell investors' concern about the direction of U.S. Federal Reserve policy. Some analysts have detected a slight tightening in Fed policy which, they said, reflected a need to curb the recent rapid growth in money supply and to reassure investors that the Fed's

stock closed over a point higher at 98 1/2.

However, the market's enthusiasm evaporated on Thursday when the Fed funds rate stubbornly refused to fall. Fed funds had already moved sharply higher as a result of technical factors associated with the end of the first quarter, but as these abated analysts had expected the rate to drop back to under 8 1/2 per cent from its level of around 9 1/2 per cent earlier in the week.

Its failure to act accordingly unnerved the markets and even comments by Mr. Martin Feldstein, chairman of the Council of Economic Advisors, who said on Wednesday that the Federal Reserve had not tightened monetary policy, failed to reassure nervous investors.

By the end of the week, however, the debt markets appeared to have recovered their spirits, helped partly by better-than-expected money supply figures. The 10-year Treasury note fell by 1/8 point in the week ended March 30. By the close of business on Friday the Fed funds rate had traded down to 8 1/2 per cent and the Treasury long bond had risen by more than a quarter point.

Market analysts are hoping that the latest figures are evidence that the expected slowdown in monetary aggregates is occurring. However, they are holding fire until they hear what Mr. Paul Volcker has to say about the Fed's monetary policy to the Senate Banking Committee tomorrow.

Despite the uncertainty about the market's direction the pace of corporate and municipal debt issues has accelerated taking advantage of the lack of new Treasury issues.

A \$3.9bn offering of New York State tax and revenue anticipation notes was oversubscribed and the net interest cost for the state was the lowest for four years at 6.174 per cent.

In the corporate sector Southern Bell Telephone and Telegraph Company, part of ATT, raised some \$200m of 11 1/2 per cent 40-year debentures priced at 98.575 to yield 11.885 per cent.

William Hall

Operating result recovers at German merchant bank

BY STEWART FLEMING IN FRANKFURT

BERLINER Handels- und Bank (BHF Bank), West Germany's largest merchant bank with total assets of DM 21bn, reports a sharp recovery in operating profits for 1982.

In common with other commercial and merchant banks in Germany, BHF has benefited from falling interest rates in both its lending and securities dealing operations. Interest earnings by the group rose from DM 263.4m to DM 333.8m.

Partial operating earnings including commission income of DM 83.3m, and deducting operating expenses of DM 220.7m were DM 197.5m, up from DM 118.2m in 1981.

For the parent bank, which has assets of DM 9.1bn, the

company reported an increase in operating profits from DM 62m to DM 118m. However, full operating earnings, including securities income, increased more sharply.

At both the parent bank and group level, the bank has been forced to make substantial write-offs as a result of loan losses and has made provisions against potential loan losses. Group provisions increased from DM 98m to DM 177m. At the parent bank level, the increase is from DM 43m to DM 110.2m.

Among loan losses it has had to account for is a write-off as a result of its involvement in ASG-Telefunken, which the bank says was its biggest ever

loan loss.

BHF is a wholesale bank without retail banking operations and is thus heavily dependent on money market financing. As a result it has profited from the sharp fall in interest rates over the past year. It is also one of the leading West German issuing and securities trading houses and its operations in this area too have been highly profitable in a period of heavy stock and bond market trading.

In common with its competitors, the bank has been cautiously avoiding the expansion of its balance sheet in a period of weak loan demand and tightening equity capital regulations.

Overseas Union Bank lifts profit

By George Lee in Singapore

OVERSEAS Union Bank, one of the big four Singapore banks, has posted a 12 per cent improvement in group net profit to \$59.2m for 1982. Post-tax profits of the parent bank rose less rapidly, up by 7 per cent to \$47.5m.

The group proposes a final gross dividend of 6 per cent, making an unchanged total of 15 per cent for the year.

Commercial Bank of Korea, the major commercial bank, had one of its worst years in 1982, principally due to a severe cut in regulated domestic interest rates at mid-year. Asia Chartered reports from Seoul. Although total assets grew 10 per cent to \$10.5bn, net income fell from \$42m to \$13.5m.

Cheung Kong shares for trading partner

BY ANDREW FISHER IN HONG KONG

THE DEPRESSED state of the Hong Kong property market has prompted Cheung Kong Holdings, a major company in the sector, to buy out its partner in a big industrial site.

Cheung Kong will take shares worth HK\$27m (\$34m) to Green Island Cement, its associate in the development project at Hung Hom on the Colony's mainland near the airport and waterfront.

The 24.58m shares will be issued at HK\$9.25 each and personally guaranteed for 14 months at this price by Mr Li Ka-shing, chairman of Cheung Kong. The issue will be Cheung Kong's first public offering of shares since its IPO in 1969. The share issue will give Green Island Cement 25 per cent of the Cheung Kong equity.

to Green Island by October 1984.

Cheung Kong's announcement of the deal came shortly after it reported sharply lower net profits for 1982 of HK\$34m against HK\$1.6m after making provisions totalling HK\$37m on the lower value of its landbank and holdings in other development companies.

The group already owns 40 per cent of Green Island, which last year reported a much lower 1982 earnings. The value of the share issue represents the amount due to Green Island for the Hung Hom site after discounting annual interest of 12 per cent up to October 1984.

The share issue will give Green Island just over 25 per cent of the Cheung Kong equity.

Chairman elected at Caltex

Mr Howard V. Yergin has been elected chairman of the board and chief executive officer of CALTEX PETROLEUM CORP. effective August 1. Mr Raymond F. Johnson, a senior vice-president of Caltex, will succeed Mr Yergin as president. Mr Yergin will succeed Mr William E. Tucker, chairman and chief executive since November 1981, who retires on August 1. A new office of the chairman has also been established. It will be composed of Mr Yergin as chairman, Mr Johnson as president and Mr Seymour S. Miller, senior vice-president and a director of the company. The office will be responsible for matters affecting long-range conduct of the company's business.

Mr Robert Cooley, assistant director of Guinness Mahon and Co., has been appointed managing director of PEOPLE'S BANK in Sri Lanka, a joint venture between People's Bank in Sri Lanka and Guinness Mahon in London.

THE BASIN RESOURCES, Canadian-based oil and gas company trading in London under Rule 16B, has reorganised its officers and directors. Four of the existing directors have resigned and six additional directors have been appointed. The reconstituted board is as follows: Mr Murray Peabody (chair-

man); Mr Arthur Clemens (president); Mr Gilbert Gerding, Mr Stuart Lewis, Mr Robert Barbero; Mr Anthony Feldman; Mr Raymond A. McLean; Mr Dick Groot and Mr G. Arnold Armstrong. Mr Elmer Keys has been appointed secretary.

The board of ALLIED CORP has elected Bendix Corp officers, in a move representing the beginning of the process to combine the Allied and Bendix corporate staffs. Mr William C. Purdie, Bendix executive vice-president and president of its aerospace/electronics group was named group vice-president, while retaining his current position. Mr J. Masson Reynolds remains president of Bendix Automotive Group. Mr Frederick W. Searby remains president of Bendix Industrial Group, and becomes group vice-president. Mr John W. Weil, Bendix senior vice-president and chief technical officer, was named vice-president of advanced technology and engineering. As part of the restructuring of Allied's finance department Mr Nicholas A. Camerra was elected vice-president of planning and development. He succeeds Mr Peter J. Schiller, who was elected vice-president responsible for carrying out the Allied/Bendix consolidation. Mr Donald R. Sawyer, senior vice-president and chief financial officer, was named vice-president of finance, succeeding Mr Cameron.

Mr Albert Benexa has been elected a director and senior vice-chairman of the AMERICAN EXPRESS INTERNATIONAL BANKING CORP (AIBIC) — which recently combined opera-

tions with the non-U.S. banking business of Trade Development Bank Holding Co. (TDBH). Mr Benexa, who has been with TDBH for 21 years, was also named chief credit officer of



Mr Albert Benexa, senior vice chairman of American Express International Banking Corp.

AIBIC worldwide. He will continue as general manager of Trade Development Bank, Geneva, a post he held for 12 years. Mr Robert A. Savage has been elected a director and vice-chairman of AIBIC. He most recently served as treasurer and executive vice-president.

CREDIT COMMERCIAL DE FRANCE has appointed Mr Charles de Croisset to head its international department. He will assume the responsibility of general manager, who will cease to work full time for the bank

INTERNATIONAL APPOINTMENTS

from June 30. He has expressed his wish to leave CCF to head a new bank in Luxembourg but will remain with CCF in a part-time advisory position.

Three appointments have been made in the space operation at FORAEROSPACE AND COMMUNICATIONS. Mr Eugene T. Jig has been named deputy director, advanced programs and technology, a new position. He was deputy director, programs, Mr Jack E. Richards, formerly manager, of the DYNELSAT VNA program, has been named deputy director, programs, Mr Jig, Mr Louis J. Bruno, formerly deputy manager of the DYNELSAT VNA program, has been appointed manager, replacing Mr Richards.

BANKERS TRUST COMPANY, New York, has appointed Mr D. Thomas Abbott, vice-president, as its new representative in Amsterdam. He assumes responsibility for Dutch financial institutions and corporate clients of the bank's international department. He replaces Mr Walter A. Hendrickson, who is transferring to the London office, to take charge of corporate business in southern England and Scandinavia within the bank's international department. Mr William Van Aalst, assistant treasurer, has been assigned to Amsterdam as business relationship manager. The company has just opened a representative office in Cairo, Mr Peter R. Johnson, vice-president, has been appointed as representative.

Mr Kane Schindler has been appointed chairman, and Dr Peter Weichardt and Dr Johann Georg Hartmann members of the newly-formed management committee of SCHINDLER HOLDING, the Swiss-based parent company of the Schindler Lifts Group. Mr Schindler remains managing director but leaves the actual group management, which will now be headed by Dr Weichardt as chairman.

Mr S. D. de Bree has been appointed executive vice-president in charge of DSM's plastics division from June 1, when Mr A. P. Groeneweg (who succeeds) will join NV Nederlandse Gasunie, to become president on May 1 1984.

Mr Dietrich Forstner, partner of Bank La Roche and Co. has succeeded Prof. Hans Guth, chairman of Dreyfus Soehne and Co., as chairman of the BASIL STOK EXCHANGE.

Mr Helmut Scholten has been appointed senior vice-chairman of WORLD-WIDE SHIPPING AGENCY, in Hong Kong, part of Sir Yue-Kong Pao's World-Wide Shipping Group. Mr Stephen Y. K. Pao has been appointed as senior executive director of World-Wide Shipping Agency, and also as a director of Marine Navigation Company, the group's affiliate in London.

Mr Ghassan Al-Nagib has been appointed to the board of the ARAB INSURANCE GROUP. He has long experience of the insurance market as general manager of the Kuwait Reinsurance Company, based in Kuwait.

Mr Clifford M. Kirtland Jr, chairman and chief executive officer of COX COMMUNICATIONS INC. will step down on June 1. He will continue as a director until the year-end. Company president Mr William A. Schwartz will succeed Mr Kirtland as chief executive officer. No other management changes are planned.

Mr Peter J. Wright has been appointed a vice-president at MONTAGU BANK CANADA, with responsibility for the Vancouver branch and the British Columbia region.

Mr John McInerney has joined EUROPEAN AMERICAN BANK, New York, as vice-president in the partnership lending unit of the merchant banking group. Partnership lending makes secured loans to tax-oriented investment partnerships. He will be responsible for partnership lending to the oil and gas, and equipment leading industries.

Mr John E. Keadarsh will join the bank as senior vice-president in charge of the automation services division. He was most recently executive vice-president of operations and data processing at New Jersey National Bank.

Mr Chandler Ide will resign as chairman of the board of NATOMAS COMPANY following the annual meeting on May 3. Mr J. Dorman L. Commons will be elected as board chairman, in addition to continuing as chief executive officer. He has been president of Natomas for the past nine years.

FT INTERNATIONAL BOND SERVICE

U.S. DOLLAR STRAIGHTS	Issued	Bid	Offer
Ames 0/5 Fln. 100 30	100	99 1/2	99 3/4
Amro Bank 13 30	200	100 1/2	100 3/4
Amro Bank 12 30	200	99 1/2	99 3/4
British Col. Hyd. 104 30	200	99 1/2	99 3/4
Canada 14 30	175	111 1/2	111 3/4
Canada 12 30	175	109 1/2	109 3/4
Canada 10 30	175	107 1/2	107 3/4
Canada 8 30	175	105 1/2	105 3/4
Canada 6 30	175	103 1/2	103 3/4
Canada 4 30	175	101 1/2	101 3/4
Canada 2 30	175	99 1/2	99 3/4
Canada 0 30	175	97 1/2	97 3/4
Canada 0 30	175	95 1/2	95 3/4
Canada 0 30	175	93 1/2	93 3/4
Canada 0 30	175	91 1/2	91 3/4
Canada 0 30	175	89 1/2	89 3/4
Canada 0 30	175	87 1/2	87 3/4
Canada 0 30	175	85 1/2	85 3/4
Canada 0 30	175	83 1/2	83 3/4
Canada 0 30	175	81 1/2	81 3/4
Canada 0 30	175	79 1/2	79 3/4
Canada 0 30	175	77 1/2	77 3/4
Canada 0 30	175	75 1/2	75 3/4
Canada 0 30	175	73 1/2	73 3/4
Canada 0 30	175	71 1/2	71 3/4
Canada 0 30	175	69 1/2	69 3/4
Canada 0 30	175	67 1/2	67 3/4
Canada 0 30	175	65 1/2	65 3/4
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Canada 0 30	175	59 1/2	59 3/4
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Canada 0 30	175	53 1/2	53 3/4
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Canada 0 30	175	0 1/4	0 1/2
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Canada 0 30	175	0 1/132922799138515753690544539884034176	0 1/66461399569257876845272269942017088
Canada 0 30	175	0 1/265845598277031507381089079768068352	0 1/132922799138515753690544539884034176
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Canada 0 30	175		

UK COMPANY NEWS

Laird advances to £19.1m at year end: lifts payout

SECOND HALF taxable profits of Laird Group advanced from £8.2m to £9.7m, leaving this year's profit after tax at £19.1m in 1982. The year's turnover rose from £272.2m to £305.5m.

The final dividend is being raised from 2p to 2.1p net per share making a higher total of 4.2p (4p). Earnings per share are given as 18.7p (18.5p).

Tax took £3.95m (£3.96m) including £2.5m (£2.5m) for overseas and £1.45m (£1.46m) for the UK. The group's effective tax rate of 13.1% (£13.1%) is lower than the 1981 rate of 14.1% (£14.1%). Dividends absorbed £3.3m (£3.3m) leaving retained profits of £3.5m (£3.5m).

Current cost adjustments reduced the after tax profit to £18.6m and earnings per share to 18.2p.

A revaluation of a subsidiary of stocks and work in progress in 1981 and earlier years has been corrected by reducing the group profits for 1981 by £307,000 and by writing off £855,000 against revenue reserves for earlier years.

comment

With its shipbuilding interests nationalised and its steel-making division liquidated three years

ago, the Laird Group has weathered the recession well in the UK. But the long-term contracts in Hong Kong of the Metro-Caswell train engineering company will be completed by 1985 and as there are no further major contracts in the UK, the group's profits are likely to be dented by next year. But a recent order from British Rail to produce prototypes to replace its 3,000 aging suburban diesel multiple units, has given Laird hopes of having away some of the future production work from BR Engineering in the post-1985 period. Better short-term prospects are offered by the production of long-distance coaches, which soaked up a major injection of capital last year, and European-style long-distance coaches, which expanded into the U.S. has so far proved a disappointment.

SHARE STAKES

Cadbury Schweppes - Sir Adrian Cadbury has reduced his non-beneficial holding by the transfer of £2,700 ordinary shares to a beneficiary under a trust.

British Vits - L. D. Lewin, a director, has sold 10,000 ordinary shares. N. M. Grimshaw, a director, has sold 50,000 and G. Blunt, a director, has sold 7,500.

Groveland Group - Sonesta Investment Co. has acquired 200,000 ordinary shares, increasing holding to 15.9m (30.84 per cent).

Murray Glenfield - Courtalds Pensions Common Investment Fund now holds 1.88m ordinary (18 per cent) in the name of the nominee company, Courtalds CIP Nominees.

Agreed £6m purchase of Lesme by Avana

Avana Group, which makes a wide range of food products, yesterday announced an agreed bid for Lesme, a privately-owned bulk chocolate maker, worth £6m.

The opportunity to bid for the company arose because Gill and Duffus, which has held a 33 per cent stake in Lesme since 1970, wanted to sell its holding.

Avana, which until now has had no involvement in the chocolate making business, will finance the purchase by issuing Avana shares worth £6m.

Lesme is in the process of moving to a new factory in Banbury, and so at present manufactures from two sites. When the new factory is completed, around the end of the year, the original London factory, founded in 1921, will be closed.

In the year to September 30 1982, Lesme earned pre-tax profits of £955,000 on a turnover of £14.5m. Its net assets at that time were £4.5m.

Mr Tom Barrett, Avana's finance director, said yesterday that a major attraction was the fact that Lesme was about to move into a new factory. In addition, he noted that Lesme was beginning to move into retailing - mainly selling chocolate chips and filled chocolate eggs - and would benefit from Avana's strength in the retail and marketing areas.

When Gill and Duffus decided it wanted to pull out one of the other one-third shareholders, joint managing director Mr Derek Anderson, chose to follow its lead. This meant that Mr David Atwell, the company's other joint managing director, was faced with a choice of buying the other two out, or agreeing with them to find a buyer for the company.

Mr Atwell said yesterday that he had eventually decided to sell, in part because of the great cost of buying the 66 per cent he did not own. He will nevertheless remain as sole managing director, and will be joined on the board by Dr John Randall, Avana's chairman, and Mr Barrett. Mr Atwell said he had great faith in Avana, and was happy to give them his full support.

Mr Anderson will remain a consultant to Lesme, but will take up a new post with a commodity trading firm in London.

Smurfit expands further in U.S.

BY DAVID DODWELL

Jefferson Smurfit, the Dublin paper and packaging products manufacturer, has bought the 50 per cent of Smurfit Diamond Packaging Corporation that it did not already own for \$8.5m (£5.67m).

Jefferson bought its original 50 per cent stake in the company from Diamond International in July last year in a deal worth \$34m. The other 50 per cent was taken up by Clarke Enterprises of Chicago, though Jefferson had a 10-year option to buy the remaining 50 per cent.

Mr Howard Kilroy, Jefferson's chief operations director, said Jefferson had agreed to pay Clarke in cash from current funds. "We have moved fairly quickly to take up our option because we like what we see," he said.

The original deal, the two partners paid \$7.5m apiece, and raised a \$70m long-term loan in the U.S. to buy from Diamond its packaging, container, paper divisions.

Smurfit Diamond, together with other Smurfit operations in the U.S., has sales of more than \$725m a year, the company said at the weekend. Combined operations employ 6,500 people in 70 plants.

Smurfit Diamond itself is based in Cincinnati. In 1981 as part of Diamond it made profits of \$8.5m before tax, on sales of

\$180m. More recent figures will be revealed when Jefferson Smurfit announces annual profits and turnover figures at the end of the month.

Milford chief gets new shares prior to rights

A PRESSING need for funds has prompted the publication of Milford's prospectus to come up with an unusual scheme for the introduction of new capital.

In terms of an agreement with its chairman, Mr Jack Bennett, the company plans to issue to him some 338,000 new ordinary shares at 10p per unit, compared with the 21 nominal value of the shares in return for the contract requires Mr Bennett to find underwriters for a rights issue which is intended to raise a further £500,000.

Milford revealed yesterday that its bankers had refused to advance further funds because of continuing heavy losses. The shares fell 15p to 80p on the

Cope Allman reiterates rejection of Dowable

THE BOARD of Cope Allman, fighting off a hostile bid from the Dowable consortium, said on Friday that it was "very gratified" at the failure of the consortium to acquire more than 10 per cent of the company's shares by the first closing date for the bid on Wednesday.

In response to the Dowable decision to extend the offer, which was Cope Allman at £22.75m, for a further two weeks, Mr Michael Doherty, the company's chief executive, said: "It remains the view of the board that the offer is totally inadequate and unacceptable." He strongly advised shareholders to reject "this opportunistic bid."

Cope Allman, which has interests ranging from leather to packaging and engineering, emphasised that the offer had attracted sales from shareholders accounting for just 1.8 per cent of Cope's shares. Dowable had held 18.7 per cent before the formal bid was mounted.

NatWest Registrars Department

National Westminster Bank PLC has been appointed Registrar of

A. Monk & Company p.l.c.

All documents for registration and correspondence should in future be sent to:

National Westminster Bank PLC
Registrars Department
PO Box No 82
37 Broad Street
Bristol BS99 7NH

Telephone Bristol (STD Code 0272)
Register enquiries 290711
Other matters 263000

Granville & Co. Limited
(formerly M. J. H. Nightingale & Co. Limited)

27/28 Lovat Lane London EC3R 8EB Telephone 01-621 1212

Over-the-Counter Market

Company	Price	Change	Gross Yield	F/E	Fully
4,416 capitalisation	133	-	8.4	4.8	10.2
AAA. Brit. Ind. CULS	149	-	10.0	6.7	17.7
Albright Group	62	-	6.1	14.3	15.7
Arrol-Johnston	30	-	11.4	3.6	13.2
Barron Hill	315	-	11.4	3.6	13.2
CC 11/12 Conv. Pwll	138	-	11.4	3.6	13.2
Clidore Group	210	-	11.4	3.6	13.2
Clidore Services	62	-	11.4	3.6	13.2
Frank Horne	34	-	11.4	3.6	13.2
Frederick Parker	62	-	11.4	3.6	13.2
George Blair	62	-	11.4	3.6	13.2
Ind. Precision Castings	156	-	11.4	3.6	13.2
Jack & Co. Prof.	156	-	11.4	3.6	13.2
Jack & Co. Prof.	156	-	11.4	3.6	13.2
Robert Jenkins	152	-	11.4	3.6	13.2
Scrummings	152	-	11.4	3.6	13.2
Tandey & Co. Ltd	112	-	11.4	3.6	13.2
Unicoll Holdings	25	-	11.4	3.6	13.2
Walter Alexander	85	-	11.4	3.6	13.2
W. S. Yates	252	-	11.4	3.6	13.2

Prices now available on Prestel page 48148.

FINANCE FOR INDUSTRY TERM DEPOSITS.

Deposits of £1,000-£50,000 accepted for fixed terms of 3-10 years. Interest paid gross, half-yearly. Rates for deposits received not later than 23/4/83.

TERMS (years)	3	4	5	6	7	8	9	10
INTEREST %	10.1	10.4	10.7	11.1	11.4	11.7	12.1	12.4

Deposits to and further information from The Treasurer, Finance for Industry plc, 91 Watford Rd., London SE1 8XP (01-928 7822, Ext. 367). Cheques payable to "Bank of England, at FFI" FFI is the holding company for ICFC.

EQUITIES									
Issue	Price	Amount in £ millions	1982/3 Revenue	1982/3 Profit	1982/3		Stock	Dividend pence	Yield %
					High	Low			
140	F.P.	154	445	123	SAirship Inds.....	153	—	—	—
112	F.P.	164	104	125	SAirco. British Pers.....	151	—	67.0	1.1
	F.P.	161	129	—	SAirco Mfg'n U.S.A. Inc.....	95	—	0.6	0.5
1180	F.P.	161	255	228	SAirbus Group.....	150	—	2.5	2.5
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
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1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112	89	SAirbus Helicopters.....	150	—	1.1	1.1
1	F.P.	154	112</						

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AMERICAN STOCK EXCHANGE COMPOSITE PRICES

Closing prices April 8

Stock	Open	High	Low	Close	Change	Volume	Time
Am. Tobacco	120 1/2	121 1/2	120 1/2	121 1/2	+1/2	100	12:00
Am. Sugar	110 1/2	111 1/2	110 1/2	111 1/2	+1/2	100	12:00
Am. Oil	100 1/2	101 1/2	100 1/2	101 1/2	+1/2	100	12:00
Am. Lumber	90 1/2	91 1/2	90 1/2	91 1/2	+1/2	100	12:00
Am. Cotton	80 1/2	81 1/2	80 1/2	81 1/2	+1/2	100	12:00
Am. Wheat	70 1/2	71 1/2	70 1/2	71 1/2	+1/2	100	12:00
Am. Corn	60 1/2	61 1/2	60 1/2	61 1/2	+1/2	100	12:00
Am. Soybean	50 1/2	51 1/2	50 1/2	51 1/2	+1/2	100	12:00
Am. Rice	40 1/2	41 1/2	40 1/2	41 1/2	+1/2	100	12:00
Am. Beans	30 1/2	31 1/2	30 1/2	31 1/2	+1/2	100	12:00
Am. Peas	20 1/2	21 1/2	20 1/2	21 1/2	+1/2	100	12:00
Am. Lentils	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Chickpeas	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Mung Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Garbanzo Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Kidney Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Navy Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Pinto Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Black Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Great Northern Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Broad Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Horse Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Runner Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Snake Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Long Kidney Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. French Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Lima Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Butter Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Cranberry Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Kidney Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Navy Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Pinto Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Black Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Great Northern Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Broad Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Horse Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Runner Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Snake Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Long Kidney Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. French Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Lima Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Butter Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Cranberry Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Kidney Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Navy Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Pinto Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00
Am. Black Beans	10 1/2	11 1/2	10 1/2	11 1/2	+1/2	100	12:00

Continued on Page 2

NEW YORK STOCK EXCHANGE COMPOSITE PRICES

[illegible]

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Sales figures unofficial. Yearly highs and lows reflect the previous 52 weeks plus the current week, and not the latest trading day. Where a split or stock dividend amounting to 25% or more is indicated, the figures are based on the number of shares outstanding after the split or stock dividend. Unless otherwise noted, ratios of dividends are annual dividends based on the latest declaration.

a-dividend also extra(s). b-annual rate of dividend plus stock dividend. c-leap-year dividend. dso-called "new" yearly dividend. e-dividend in Canadian dollars. f-dividend in U.S. dollars. g-dividend declared after split-up or stock dividend. h-dividend in U.S. dollars. i-dividend in Canadian dollars. j-dividend in U.S. dollars. k-dividend in U.S. dollars. l-dividend declared or paid this year, an accumulative issue with dividends in arrears. m-new issue in the past 52 weeks. The high-low range is the high-low range in the past 52 weeks. n-dividend in U.S. dollars. o-dividend in U.S. dollars. p-dividend in U.S. dollars. q-dividend in U.S. dollars. r-dividend in U.S. dollars. s-dividend in U.S. dollars. t-dividend in U.S. dollars. u-dividend in U.S. dollars. v-dividend in U.S. dollars. w-dividend in U.S. dollars. x-dividend in U.S. dollars. y-dividend in U.S. dollars. z-dividend in U.S. dollars.

5% Sinking Fund External Loan Bonds due May 1, 1985

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

... ..

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UNK

VALIN POLLEN

CURRENCIES; MONEY and CAPITAL MARKETS

FOREIGN EXCHANGES

Sterling pauses for breath

BY JONAS CROSLAND

Sterling finished below its best levels of the week as the market reacted to the recent sharp rise. The former trend was principally an upward technical correction with short covering accounting for much of the rise. Apart from the inevitable profit taking, sterling's rise was checked by two other factors. First there was some reaction to the prospect of a cut in UK clearing bank base rates. This however does not appear as imminent as had been thought earlier in the week. Secondly the pound was affected by the dollar's steady performance as the market remained uncertain over U.S. interest rate trends.

How much of sterling's recovery reflected its previous oversold position and how much could be apportioned to North Sea oil prices remains to be seen. Some have argued that sterling should never have been as low as it was. It certainly seems dangerous to look too far ahead since sterling remains extremely sensitive to any further oil price developments in which case economic rationale goes out of the window.

End of quarter technicalities had served to keep U.S. Federal funds well above the 9 per cent level but there was little indication of any sustained fall last week and there was consequently no rush to go short on dollars.

FORWARD RATES AGAINST STERLING

	Spot	1 month	3 months	6 months	12 months
Dollar	1.5090	1.5090	1.5090	1.5090	1.4990
DM	3.8525	3.8525	3.8525	3.8525	3.8490
French Franc	10.35	10.35	10.35	10.35	10.35
Swiss Franc	3.10	3.0525	3.0525	3.0525	3.0525
Japanese Yen	360.5	360.5	360.5	360.5	360.5

EMS EUROPEAN CURRENCY UNIT RATES

	ECU central bank rate April 8	% change from central bank rate	% change from adjusted divergence	Divergence limit %
Belgian Franc	44.3622	+0.72	+0.32	-1.600
Danish Krone	8.0412	-0.78	-1.19	-1.600
German Mark	2.2187	-0.78	-1.19	-1.600
French Franc	6.5596	-0.80	-1.21	-1.600
Dutch Guilder	2.3637	+1.48	+1.05	-1.600
Irish Punt	0.7876	-0.72	-1.21	-1.600
Italian Lira	1366.7	-3.42	-3.42	-4.163

Changes are for ECU, therefore positive change denotes a weak currency. Adjustment calculated by Financial Times.

OTHER CURRENCIES

	Apr. 8	2	5	8	11	14	17	20	23	26	29	May 1
Argentina Peso	1.4,088.04283	59,240.60,290	Austria	25.45-25.75								
Australia Dollar	1.7565-1.7585	1.1455-1.1555	Belgium	73.55-74.00								
Brazil Cruzeiro	2,577.09-2,580.09	435.65-436.10	Denmark	12.90-13.00								
Canadian Dollar	0.7527-0.7537	0.6435-0.6465	France	10.91-11.01								
Chinese Yuan	2.3637	2.3637	Germany	2.21-2.22								
Dutch Guilder	2.3637	2.3637	Greece	2.21-2.22								
Irish Punt	0.7876	0.7876	Italy	21.00-21.10								
Japanese Yen	360.5	360.5	Netherlands	2.21-2.22								
South African Rand	1.5010-1.5030	1.0970-1.0995	Norway	10.70-10.80								
U.S. Dollar	1.5090	1.5090	Portugal	20.00-20.10								
			Spain	16.50-16.60								
			Sweden	1.49-1.50								
			Switzerland	1.49-1.50								
			United States	1.49-1.50								
			Yugoslavia	117.131								

* Selling rates.

THE POUND SPOT AND FORWARD

	Apr. 8	Day's spread	Close	One month	Three months	6 months	12 months
U.S.	1.5010-1.5110	1.5045-1.5095	0.15-0.10c pm	1.00 0.32-0.27 pm	0.76		
Canada	1.2850-1.2940	1.2875-1.2925	0.15-0.05c pm	0.64 0.23-0.23 pm	0.80		
Netherlands	4.09-4.12	4.11-4.12	2 1/4-1/4 pm	5.48 5 1/4-5 1/4 pm	0.82		
Belgium	72.55-72.65	72.55-72.65	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Denmark	12.30-12.35	12.30-12.35	4 1/2-1/2 pm	4.34 11 1/2-12 1/2 pm	2.74		
Ireland	1.1025-1.1050	1.1050-1.1050	0.57-0.80 pm	8.25 4 1/2-5 1/2 pm	5.10		
W. Ger.	3.62-3.65	3.62-3.65	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Portugal	20.00-20.10	20.00-20.10	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Spain	16.50-16.60	16.50-16.60	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Italy	21.00-21.10	21.00-21.10	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Norway	10.70-10.80	10.70-10.80	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
France	10.91-11.01	10.91-11.01	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Sweden	11.20-11.31	11.20-11.31	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Japan	360.5	360.5	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Austria	25.45-25.75	25.45-25.75	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
Switzerland	2.21-2.22	2.21-2.22	1/2-1/2 pm	1.65 2 1/4-2 1/4 pm	1.81		
U.S.	1.5010-1.5110	1.5045-1.5095	0.15-0.10c pm	1.00 0.32-0.27 pm	0.76		

Belgian rate is for convertible franc. Financial franc 73.70-73.80. Six-month forward dollar 0.38-0.33c pm. 12-month 0.60-0.45c pm.

EXCHANGE CROSS RATES

Apr. 8	Pound Sterling	U.S. Dollar	Deutsche Mark	Japanese Yen	French Franc	Swiss Franc	Dutch Guilder	Italian Lira	Canada Dollar	Belgian Franc
Pound Sterling	0.564	1.205	5.555	360.5	10.99	5.100	4.118	2175.	1.058	78.70
U.S. Dollar	1.578	329.5	5.557	7.18	6.559	2.700	2.364	1465.	0.653	48.53
Deutsche Mark	0.274	0.413	1.11	98.70	8.998	0.949	1.137	595.3	0.509	19.90
Japanese Yen 1,000	2.714	4.175	10.13	1000.	20.87	8.599	11.42	6038.	5.154	201.7
French Franc 100	0.593	1.374	5.336	329.3	10.	3.831	3.760	1996.	1.697	66.89
Swiss Franc	0.593	0.468	1.178	116.5	3.558	1.	1.528	1058.	0.599	33.45
Dutch Guilder	0.843	0.858	0.887	67.56	2.659	0.763	1.31	580.1	0.451	17.68
Italian Lira 1,000	0.420	0.688	1.658	165.8	1.001	2.894	1.001	3053.	0.389	15.08
Canadian Dollar	0.526	0.810	1.996	194.0	5.982	1.666	2.916	1190.	1.1	89.13
Belgian Franc 100	1.276	2.070	5.224	465.9	10.06	4.394	5.664	2371.	2.063	79.10

MONEY MARKETS

Attention focussed on UK base rates

Last month's North Sea oil price proposals by BNOEC effectively gave the green light firstly for a sharp upward correction in the value of sterling followed by a rapid fall in UK interest rates. So far this has all been fairly predictable stuff given previous market attitudes that it was only the weakness of the pound that was keeping rates firm.

Earlier this year base rates were jacked up to 11 per cent in response to sterling's weakness in a hardly popular but entirely logical move. There may have been a case for even higher rates although the Bank of England was generous in its day to day operations. But the market has turned on the houses to a degree that has been a little too rapid for the Bank's liking.

One could argue that any sustained fall in rates based mainly on sterling's continued better performance is hardly a substantial base although this remains to be seen. Hopes of a cut this week would most probably benefit from some lead in U.S. markets but once again there has so far been little real indication that such a move is imminent. However this week should see further signs of a mild if rather restricted upturn in U.S. economic activity which may provide a more favourable basis for a definite downward move.

LONDON MONEY RATES

	Apr. 8	Sterling Certificate of Deposit	Interbank	Local Authority deposits	Local Auth. negotiable bonds	Finance House deposits	Company deposits	Discount Market	Treasury Bills	Eligible Bank Bills	Prime Trade Bills
Overnight	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
7 days	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
14 days	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
One month	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
Three months	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
Six months	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
Nine months	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
One year	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2
Two years	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2	10 1/2

ECOD Rate Export Finance Scheme IV Average Rate for interest period March 2 to April 5 1983 (Inclusive)

Local authorities and finance houses seven days' notice, others seven days' notice. Long-term local authority mortgage rates nominally three years 11 per cent; four years 11 1/2 per cent; five years 11 1/2 per cent. Bank bill rates in table are buying rates for prime paper. Buying rates for four month trade bills 10 1/2 per cent. Approximate selling rates for one month Treasury bills 10 1/2 per cent; two months 10 1/2 per cent; three months 10 1/2 per cent; six months 10 1/2 per cent; one year 10 1/2 per cent; two years 10 1/2 per cent. Trade bills 10 1/2 per cent; three months 10 1/2 per cent; six months 10 1/2 per cent; one year 10 1/2 per cent; two years 10 1/2 per cent. London and Scottish Clearing Bank rates for lending 10 1/2 per cent. London deposit rates for sums at seven days' notice 7 1/2 per cent. Average tender rates of discount 8 1/4 per cent. Certificates of Tax Deposit (Series B). Deposits of £100,000 and over held under one month 10 1/2 per cent; one month 10 1/2 per cent; three months 10 1/2 per cent; six months 10 1/2 per cent; one year 10 1/2 per cent; two years 10 1/2 per cent. Under £100,000 10 per cent from April 8. Deposits held under Series 3-5 10 per cent. The rate for all deposits withdrawn for cash 8 per cent.

INTEREST RATES

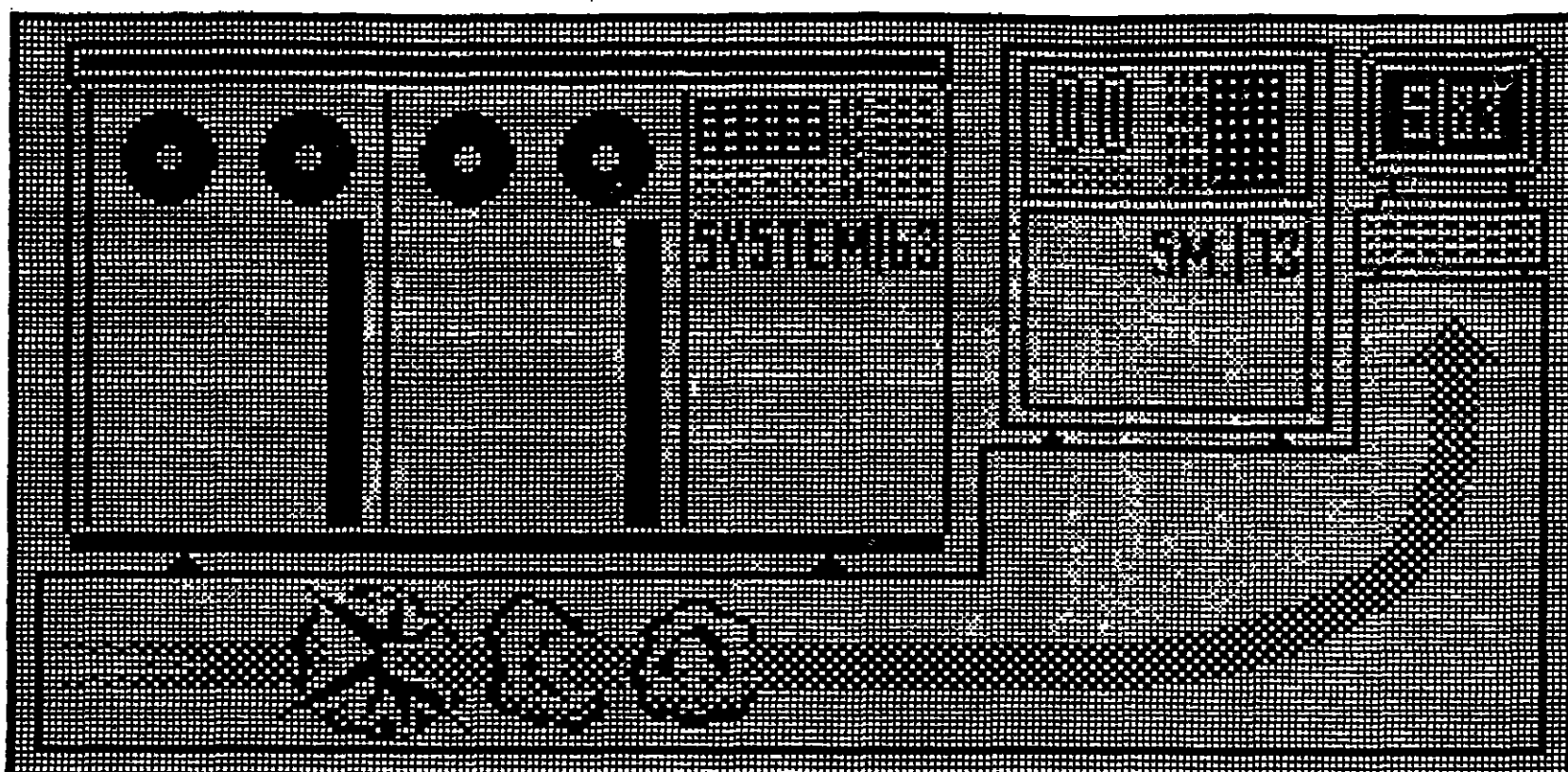
EURO-CURRENCY INTEREST RATES (Market closing rates)

Apr. 8	Short term	7 days notice	Month	Three months	Six months	One year
Sterling.....	10 1/2-10 3/4	10 1/2-10 3/4	10 1/2-10 3/4	10 1/2-10 3/4	10 1/2-10 3/4	10 1/2-10 3/4
U.S. Dollar.....	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4
Can. Dollar.....	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4
DM.....	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4
French Franc.....	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4
Deutsche Mark.....	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4
Swiss Franc.....	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4	8 1/2-8 3/4
Belg. Franc.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Comp.	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Den.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Fin.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
It. Lira.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Neth. Gld.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Port. Escudo.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Spain.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Swed. Krona.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2
Yug. Dinar.....	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2	11-11 1/2

FINANCIAL TIMES SURVEY

COMPUTERS
IN BUSINESS

Big changes are sweeping the computer world. The boom in microcomputers, highlights the growing demand for computer power at the elbows of the people who need it—and in a form that they can use easily. The shift towards more comprehensive, integrated software underlines the apparently inexhaustible demand for raw computing power.



Graphic by Michael Daley

The industry

THE COMPUTER industry has ridden the recession well, its customers displaying an apparently inexhaustible appetite for data processing power. But it has lost its traditional clarity as more and more powerful silicon chips have blurred the distinctions between big and small computers. First, there was the "super-mini", now the "supersuper" and the "microsuper".

IBM, the industry leader, steamed ahead both in profits and revenues while some other companies including Digital Equipment, the world leader in minis, slowed or faltered.

Apple Computer, leading the micro-computer pack, launched an innovative new machine to protect its flanks against IBM and the other electronics majors' incursions into the personal computer market, as Margaret Coffey reports.

Alan Cane profiles Wang, the billion dollar office automation and word processing company which sailed through the recession, growing on average by 58 per cent a year.

Prospects for the industry II

The year of the micro III

Mainframe sector under pressure III

Mini-computer intensifies IV

Wang, leader in office automation V

The customers

THE DATA processing centre is the engine room of modern business, but it powers a variety of different business vessels from pharmaceuticals to automobiles.

Here Financial Times industry specialists look at the way computers are used in their areas: in manufacturing industry, Geoffrey Chisholm reports that "it is only a matter of time before the automatic factory becomes a reality," Lynton McLean studies the transport and distribution of freight—"one of the most costly and potentially inefficient operations that management has to tackle."

The chemicals industry, covered by William Dawkins shows data processing maturity: "We are talking about the value of information rather than saving on clerks."

John Griffiths finds that, in the motor business, "computers have fast been taking over every aspect of the car" while David Churchill finds wholesalers "a natural market for computerised methods."

Key questions for purchasers V

Case studies examine applications of computer power by users, large and small VI-VII

Systems

THIS SECTION investigates the way computers are being used in a number of different types of organisation.

Jason Crisp went to Glaxo Pharmaceuticals where 500 terminals, distributed up and down the country and powered by 16 Hewlett Packard mini-computers, make 14 sites seem like one. Tim Dickson talked to Martin the Newsagent which has designed and built its own "paper tiger"—a micro for its own branches which it will market to other newsagents.

Raymond Snoddy investigated the way the British Distribution Company made use of its CTL mini. "Without the computer system we would have needed 200-250 extra people costing £250,000 a year," its managing director claimed.

Arnold Krassdorf looked at the Trustee Savings Bank Group's computer services which uses two bureaux in addition to its own central computing facilities—the first large-scale branch bank enterprise in the UK to use on-line real time systems.

Business sectors: how computer needs are being met in retailing, wholesaling, distribution, the motor industry, manufacturing, and the chemical and pharmaceutical industry VIII-XI

International

COMPUTERISATION is a world-wide phenomenon, yet each country has its own approach. In this section, Financial Times foreign correspondents look at developments in computerisation in four of the major electronics nations and in the Soviet bloc.

Louise Kehoe reports from the U.S., where American manufacturers are determined to maintain their lead in world data processing markets.

Ray Garner reports that Japan is only now beginning to find automation potentially threatening, while in Paris, David Marsh examines progress in 'informatics'.

From Moscow, Anthony Robinson hits the Iron Curtain on Russia's efforts to keep abreast of Western computer technology, while in the UK, Joan Gray reports: "Micromania swept Britain last year and shows no signs of abating."

The U.S. sets the pace XIV

Micromania sweeps Britain XV

Japan: further advances XVI

France: boom in small computers XVI

Soviets struggle to keep up XVII

The technology

INDUSTRY SPECIALISTS report on and assess the way computer technology is changing—and changing business. Richard Sharpe discusses the hardware, the physical computers themselves, while Philip Manchester writes about software, the sets of instructions needed to run the machines and their applications.

Elaine Williams discusses networking—ways of tying together computers and peripherals like printers and electronic files. Rex Winsbury looks at the progress of viewdata, the electronic link between television set and computer memory.

Terence Westgate predicts the coming of integrated subscriber data networks—telephone services for the 1990s and discusses some of the likely obstacles to their implementation—chief among which seems to be a lack of world-wide standards.

Hardware developments XVIII

Networking: wide benefits XVIII

Advances in software XIX

Viewdata developments XX

Integrated services digital networks XX

The big issues

WITHOUT DOUBT the major issue facing the data processing world is the trial of strength between IBM and AT&T in the computing, datacommunications and telecommunications markets. Guy de Jonquieres looks at an IBM freed from legal action, and an AT&T in the process of restructuring.

The Orbit study weighed the UK in the balance for fitness for the electronic office revolution and found it wanting. Its detailed conclusions are presented in this section along with articles on new ways to make computer information available to managers, the developments of systems that "reason" for themselves. John Lloyd discusses the unions and computerisation.

Battle of the giants: IBM and AT & T XXI

Training the executives XXI

Progress in standardisation XXII

Benefits of network services XXII

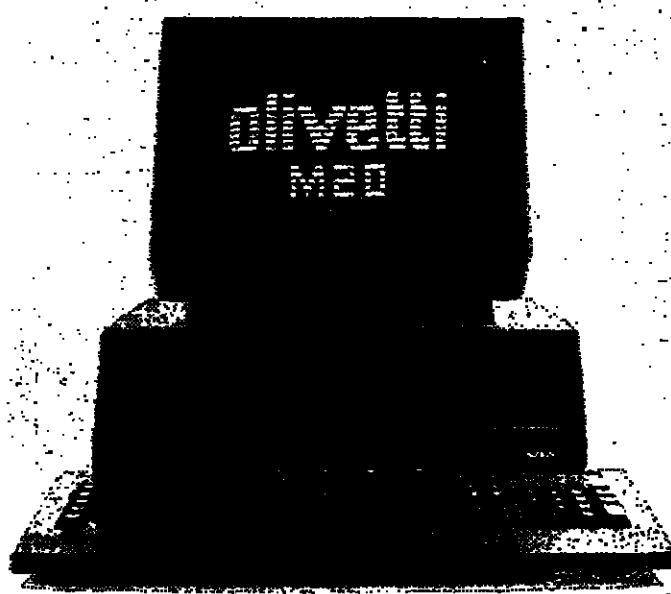
Office automation: new report XXIII

Expert systems: uncannily accurate XXIV

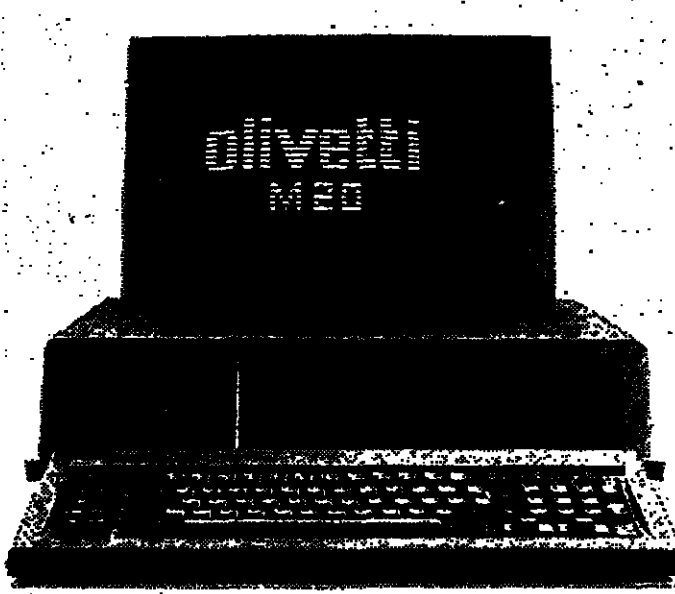
Unions: changing attitudes XXIV

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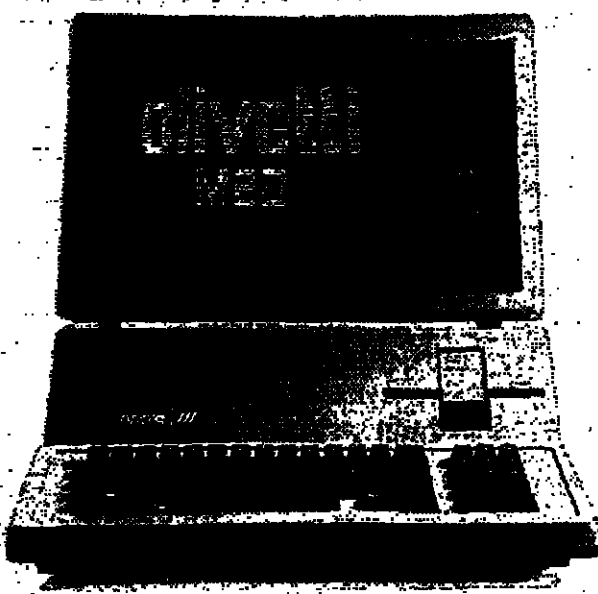
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COMPUTERS IN BUSINESS II

Despite the world recession, the computer industry has shown strong, if patchy growth. The major phenomenon of the past two years has been the dramatic rise of the microcomputer, as Alan Cane reports here

'Quiet centre of the hurricane'

THESE PAST few years will be seen in retrospect as the quiet centre of the information technology hurricane.

Despite the worst recession for 50 years, the computer industry, which existed only in rudimentary form in the 1930s, has continued to show strong, if patchy, growth.

If the world economy is truly on the up-turn, as economic indicators now suggest, the business world will be swept by a high tide of intelligent electronics which threatens to displace traditional methods and values while setting in their place new engines of growth for industry and commerce.

Without doubt, the major phenomenon of the past two years has been the emergence of the microcomputer from cupboards labelled "hobbies" and "executive toys" to take what many now believe to be its rightful place on the manager's desk.

Apple, Commodore and Tandy believed that from the beginning. They have since been joined by a host of the larger electronics manufacturers including Digital Equipment, Hewlett Packard, Philips, Olivetti, Burroughs, ICL and Wang.

Most significant of all, IBM the colossus of the computer business, made it clear it believed in a future for the professional personal computer

with the launch of its own machine first in the U.S. and now in Europe.

Only two weeks ago, IBM Japan announced the launch of what it described as a "multi-function" workstation with the capacity to combine word processing and data processing and to be built for it by the Japanese electronics giant Matsushita.

But the dramatic rise of the microcomputer is only a symptom of what is happening to the computer industry, not the cause.

The major trend is towards computer power at the elbows of the people who need it most and in such a form that they can use it easily.

That power may be provided



The business world... waiting to be swept by a high tide of intelligent electronics.

by a stand-alone personal computer although this is likely to be found only in the smallest organisations. What is much more likely is linked networks of mainframe computers, small computers, personal computers and computer terminals giving common access to resources, such as information and utilities like printers and facsimile machines.

Which is why an organisation like International Data Corporation (IDC) forecast substantial

increases for all processor markets through 1986. IDC points out that "Users continue to show an almost insatiable desire for processing power."

It was good news for IBM which reported a 22 per cent increase in net earnings for 1982 to reach \$4.4bn on revenues of \$34.36bn effectively crushing whispers that "Big Blue" was past it, after several years when the other mainframe vendors, Burroughs, Uni-

vac, NCR, CDC and Honeywell, were growing faster than the giant.

Some of IBM's competitors found the pace too strong. After some years of financial and managerial problems, Magnuson, a leading plug compatible manufacturer, threw in the towel and filed for protection under Section 11 of the U.S. bankruptcy code.

Its president, Mr. Charles Strauch, said last month that the company had been trying to restructure itself. "We were well on our way towards achieving this goal early last fall but IBM's October 1982 pricing and product announcement had a very negative effect

The major trend is towards computer power at the elbows of the people who need it most.

on the pricing of our product line."

PCMs manufacture computers which behave as if they were IBM computers to the extent of running IBM software and software written specially for customers to run on IBM computers.

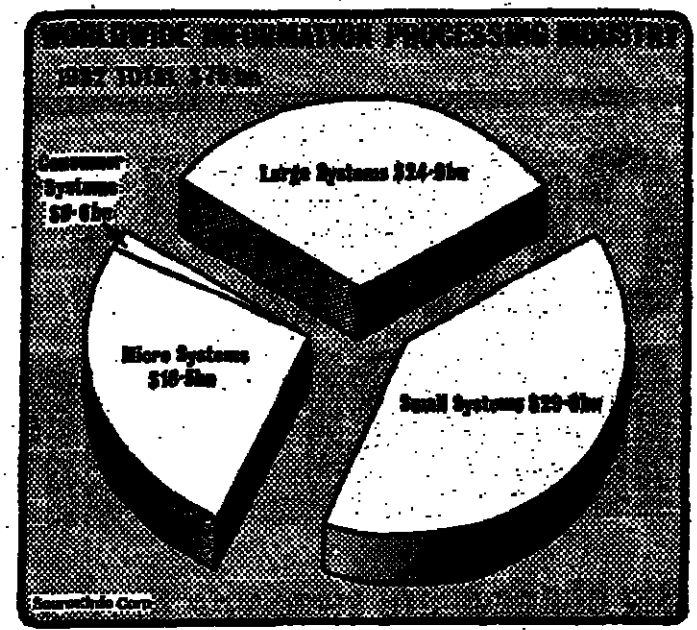
By taking advantage of the most advanced technology and innovative design, PCMs hoped to undercut IBM on hardware prices while avoiding the massive costs of developing operating software — the programs which run the computer itself — from scratch.

In theory, it looked good and companies like Amdahl and Iliel (whose computer operations were later taken over by National Semiconductor as National Advanced Systems) looked like winners in the late 1970s.

Meanwhile, IBM was spending phenomenal sums on automating its production lines to the point where most industry observers believe that no other computer company can match the giant on manufacturing costs.

IDC points out: "The PCMs are dealing with a more aggressive IBM. Price pressures and a stepped up pace of product introductions has presented the competition with a moving target."

It notes IBM's extensive use of microcode — special software instructions placed so as to make use of IBM software difficult or impossible and concludes: "With the forthcoming extended architecture and the



complications of IBM's dynamic channels and big machine input/output complex, it is no wonder that the Japanese PCMs Hitachi and Fujitsu greatly prefer to offer their own operating system software with their machines."

ICL now offers a large (15m instructions per second) Fujitsu machine as its top of the line "Atlas" computer.

NAS recently closed its San Diego manufacturing facility and now sells only Japanese computers built by Hitachi.

But even the biggest computer companies are finding that the new shape of the data processing business presents them with unexpected and awkward problems. IBM's reputation, for example, is built on a thorough marketing approach, first rate salesmanship and a customers support and service that is second to none.

All that is fine when you are selling computers at \$1.5m a time; it is even possible when you are selling minicomputers at \$100,000 a time — but it is a hopelessly uneconomic approach when you are selling microcomputers and the whole package of hardware and software is worth less than \$5,000. It affects both big and small companies — the majors with massive marketing muscle they cannot afford to apply to tiny systems and the small systems houses with little idea of what marketing is all about.

Hence the move by the IBM's DEC's and Xerox's towards high street computer stores and the use of retail outlets by companies which had traditionally only marketed directly.

The minicomputer manufacturers have long used systems houses as sales outlets — companies like Digital (DEC) Data General or Prime offer their hardware to systems houses on an OEM (original equipment manufacturer) basis.

DEC, the world leader in minicomputers, is having a lean time of it now. After nine years of spectacular, uninterrupted growth, net earnings for the half year ended January 1 were over 37 per cent down on the equivalent 1981 figure of \$187.9m, while six month revenues totalled \$1.94bn against \$1.8bn.

Minicomputer who showed strong and sustained growth were those with the strongest market niche including Wang, an office automation specialist with a powerful reputation in word processing (see page xxx) and Tandem, first of the manufacturers to offer "non-stop" computing.

The success of both Wang and Tandem — both of which sell equipment which is noted both for its quality and for its high price tag — indicates the premium which customers place on reliability. The banks are some of Tandem's best customers — Tandem Nonstop machines will be used for the London clearing banks' Cheaps

city clearing system — because of the value they place on computers which will not let them and their customers down.

It is becoming increasingly clear, however, that the stakes for remaining in the computer business are high — in fact, for almost everybody, too high.

Justifying IBM's new willingness to enter into joint ventures, Mr. Eddie Nixon, managing director of IBM (UK) said: "Perhaps we are less arrogant, more humble, than we used to be. Big as we are, we cannot do everything."

The computer business these days covers everything from chip design and manufacture to applications programs for specific customers.

One thing is certain. The video screen on the desk is here to stay — even in Russia.

IBM, with its vowed aim of covering the waterfront, has greater problems than most. Its joint agreements and ventures include buying a share of Intel, the innovative Silicon Valley semiconductor house, agreement with Matsushita (which has already led to the multifunction workstation) and an agreement with Peachtree, a software subsidiary of Management Sciences America (MSA), a major computer bureau to develop software for the Personal Computer.

Even for IBM, largest manufacturer of silicon chips in the world, the development costs of a 64,000 bit read-and-write memory chip to equal or better the Intel product, was, it seems, too high.

Earlier this year, CII Honeywell-Bull, the state-controlled French computer group which has been making heavy losses, attributed at least some of its troubles to the cost of staying in the world class high technology game.

And at the end of last month, the company in competition with Siemens of West Germany and the UK's ICL announced they were thinking of setting up a joint venture to undertake long term research on advanced computing systems.

Business customers, for their part, worry about managing a world whose traditional ties have shifted considerably. The line between telecommunications and data processing has become blurred — and both the industry and its customers await the outcome of the impending battle between IBM and AT&T with renewed interest.

Only one thing is certain. The video screen on the desk is here to stay — even in Russia. The first of the Russian Personal Computers — unashamedly modelled on the Apple II — are already rolling off the production lines in Zelenograd, near Moscow. They call it "Agatha".

WHEN IT COMES TO CHOOSING A COMPUTER COMPANY THE QUESTION ISN'T WHO'S BIGGER, IT'S WHO'S BETTER.



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But rather, on the company's quality.

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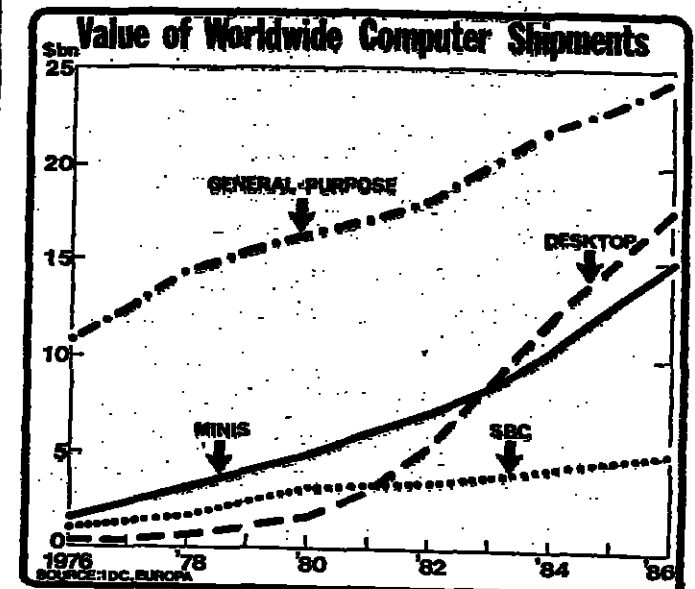
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COMPUTERS IN BUSINESS III

Dramatic fall in prices as microcomputer sales soar to new records

The year of the micro

THIS YEAR could well go down in technological history as the year that personal computers became truly personal. Business took to microcomputers in greater numbers than ever before and for the first time, large numbers of individuals bought them for their personal use. Microcomputers took a giant step out of the toy cupboard and began to be widely perceived as tools.

The figures leave no doubt that these small computers are big business. Sales of microcomputers in the UK alone last year grew by 100 per cent to reach a value of £375m. Much of this boom came about because technological advances allowed prices to fall dramatically. As prices continue to drop in future and manufacturers increase their efforts to make these machines easier to use, more and more people in all areas will find that they can afford a personal computer.

As the name implies, microcomputers are the smallest of computers. They range in price from just over £50 to about £10,000, depending on their power and complexity. They work on the same principles as their larger predecessors, the mainframe and minicomputers, and perform scaled-down ver-

sions of the same functions. Unlike the larger machines, they are designed to be used by non-technical individuals.

At the moment these individuals tend to break down into roughly three categories: business, home/hobby and education. Of these, the largest, in terms of value, is business. Last year 100,000 business microcomputers worth £285m were sold in the UK, according to a report by International Resource Development, a U.S. market research firm. By contrast only 30,000 worth of home/hobby machines were sold.

The difference between the two categories is, of course, the price of the machines involved. The average business machine in the IRED study cost £2,850; the average home/hobby computer £200.

Three U.S. companies tend to dominate the UK market for business microcomputers, according to the latest study on the microcomputer from Key Note Publications. Commodore Business Machines, Apple Computer and Tandy Corp account for the majority of the business micros now installed in the UK. They will face strong competition this year from a number of companies, including International Business Machines, which has recently introduced

its bestselling Personal Computer into the UK market from Digital Equipment Corp and ACT Sirius, a UK company that is marketing Sirius business machines in the UK.

These machines are being put to a variety of uses in business. In small companies they tend to perform the same functions, once done manually, that larger computers do in larger firms.

There is no end in sight to the boom in microcomputers.

So they are used for accounts, stock control, and word processing among other things.

In larger organisations the uses can be even more varied. With the proliferation of spreadsheet programs that began with VisiCalc personal computers have become the favoured tool of many managers. These programs allow professionals to do complex forecasts very quickly by making it possible to see what will happen each time one variable is changed.

Companies such as Apple, which has just introduced the Lisa, an expensive micro aimed directly at the executive, are working hard to ensure that personal computers appeal to top personnel. At the moment the manager, or decision maker, is a key target. The idea is to turn a computer into a kind of electronic desk so that anything a manager can do with telephone, pen and pad can be done quickly, with a personal computer.

Larger organisations have begun to use microcomputers to perform many of their routine tasks. Secretaries, clerical and junior staff are now using the machines for routine jobs such as stock control, pay roll, budgeting and sales ledger and word processing.

But the numbers of machines bought for business in the UK last year pales in comparison to those bought for use in the home. Of the 465,000 micros shipped here last year, 395,000 went into homes.

Many of the major suppliers of these machines were UK companies. Sinclair, the firm that gave the impetus to the home market when it introduced the ZX 81 for £99.95 in 1981, was selling 20,000 ZX 81s per month, according to the Key Note report.

Acorn, the manufacturer of the BBC, claims to have sold 50,000 machines last year and now claims a rate of 8,000 per month. U.S. company Commodore claimed to have sold 40,000 of its Vic 20s in the UK in the first six months of 1982 alone.

The profile of the people buying these low-priced machines has changed sharply since microcomputers first made their appearance in 1978-79. Then the buyers were typically enthusiasts, teenagers and adults with a technical bent who wanted to put a computer together and then take it apart again in the same way as many motor enthusiasts do.

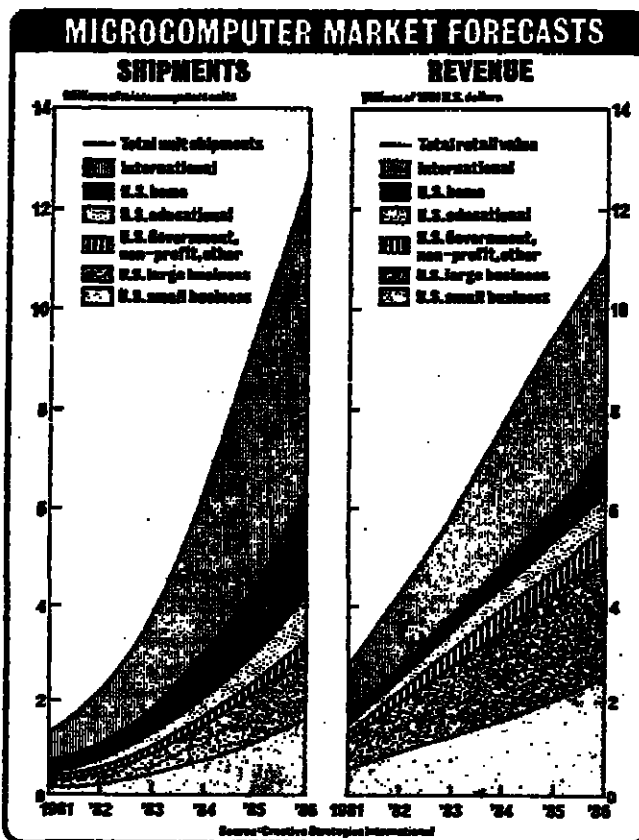
Now it has become much more of a family affair. Many buyers are people with children and they are buying the machines for a variety of reasons. Some want their children to understand computers and buy micros so that they can learn how to programme and use them. Some want to learn how to use computers themselves in order to keep household accounts etc. Whatever the reason many people find that buying the machines there seems little doubt that many of them are used to play games of the "Space Invader" and "Dungeons and Dragons" variety.

Much the same thing is happening in the U.S., the breeding ground of the microcomputer revolution. There, too, falling prices have given a tremendous boost to the home computer market. Entertainment played an even greater part because of a craze for video games. When prices dropped so far that there was little difference between buying a video game to use with the television and buying a computer, the market exploded.

"It took off last fall," explained Mr Egil Jullussen, a consultant with Future Computing, a Texas firm that follows the U.S. micro market. "Sales increased by a factor of 10 in just four or five months."

In the U.S. this year sales of 5m home computers worth \$2bn are expected, while sales of 1.5m microcomputers designed for business worth \$75m are forecast.

In the home market the leading companies are similar in the UK and U.S. Sinclair and Commodore both have major shares of the market. Texas Instruments is also a dominant supplier in the U.S. since the re-



Very Small Business Computers

Western European Market: 1981-86

Year	Units sold	Market value (\$000)
1981	160,000	1,250,000
1982	225,000	1,500,000
1983	315,000	1,775,000
1984	440,000	2,100,000
1985	615,000	2,500,000
1986	860,000	3,000,000

Compound annual growth rate: 40.0% 19.1%

Source: Creative Strategies International

lease of its 99/4A machine. The company has just launched that model in the UK and so could be a major supplier here as well by this time next year.

Apple shows up as a leader in the business market in both countries. But in the U.S. IBM has captured 19 per cent of the market for machines priced between \$1,000 and \$5,000 in the past year alone.

The educational market is a ripe field in the UK because of the Government's scheme to en-

courage the use of computers in schools. Key Note puts the value of this market at £15m per year. Until the end of 1981 Research Machines led this field with its 3802, but now Acorn claims that some half of the micros in schools are BBCs. Other machines in this market include Sinclair, Dragon 32s, Apples and Pats.

Despite sceptical forecasts there is no indication that there is any end in sight to the boom in microcomputers. Sales in the UK are expected to continue to grow by 100 per cent per year through 1985.

By the end of the decade the market for business machines could be worth anywhere from £2bn to £4bn. Although the numbers of home computers sold will continue to rise, the value of that market could drop to £350m in the early 1990s.

As the technology makes these machines more powerful at less cost, and manufacturers and software suppliers concentrate on making them easier to use, micros will move even further out of the realms of the specialist and into the mainstream. In fact, the answer to the question who is using these machines and for what, is soon likely to be: almost anyone for nearly anything.

Margaret Coffey
The author is editor of *Micro Decision*.

Mainframe sector under new pressure

A CLICHEE to avoid, as they say, like the plague is to describe a new microcomputer as "having the power of a mainframe." Certainly, today's small computers are powerful, but their power is equivalent to that of mainframes of long ago—and two years is a long time in data processing.

NCR, the U.S.-based computer manufacturer announced last month a tiny computer based on the company's very advanced 32-bit processor chip (32-bit refers to the number of binary digits equivalent to 0 or 1 that the computer processes simultaneously—the larger the number of bits, the faster the processing speed should be).

"We call it a mainframe," an NCR spokesman said. "It is two cubic feet in volume, and weighs 50 pounds. You can put it on your desk or hang it on the wall."

Such a machine, supporting as it does up to 4m words of immediate memory and over 40 terminals, would undoubtedly have been a mainframe two years ago.

Top of the NCR range, the V-8600 family, handles 18m words of immediate memory and would certainly be able to handle over 300 terminals all running simultaneously on a typical commercial job mix.

So microelectronics is driving up performance for computers of all sizes—and the computer industry is still only beginning to use very large scale integration (VLSI) in its machinery. With a million or more features on a chip made possible in just a few years, computing power of a previously unattainable order will become commonplace.

But will the manufacturers find customers for these super powerful machines?

The fastest available commercial computers, made by companies such as Cray Research, Control Data and Nippon Electric find homes in specialist areas such as meteorological research, oil prospecting and scientific research.

They are bought in very small numbers by companies to whom price is no obstacle; assuming a computer with the power of a Cray could be realised in a package the size of one of

today's microcomputers, would there be a market for it in business.

The world mainframe market is, after all, fairly depressed. The International Data Corporation (IDC) noted recently: "Neither 1981 nor 1982 will be remembered as great years in the mainframe industry."

"In 1981, the value of general purpose shipments was up just 4 per cent over 1980, although units were up 8 per cent."

It went on to predict that the overall value of shipments in 1982 would be up 6 per cent.

The continued need for centralised computing power means that the dinosaur will survive—and evolve.

over 1981, chiefly through strong shipments of the first of the new family of IBM big computers, the 3081.

It proved an accurate prophecy. Shipments of mainframe computers rose by 6 per cent in 1982 over 1981—but shipments of distributed systems—linked minicomputers—rose by around 30 per cent and office automation equipment by 36 per cent.

IDC goes on to say: "Pent up demand for mips (millions of instructions a second) has put IBM in the enviable position of being able to ship all the big systems it can build and IBM says it is making more than ever expected."

IBM had to carry the ball alone in 1982, it argued, and indeed 1983 has been marked by a spate of announcements from the BUNCH (Burroughs, Univac, NCR, CDC, Honeywell).

Burroughs announced a new top-of-the-range machine, the 7700, an object lesson in ways of distributing processing power.

What Burroughs, and other big mainframe manufacturers, do these days to divide the functions of the machine between a number of microcomputers—they, in fact, create a distributed processing system within a single cabinet.

The Burroughs machine can achieve up to 100,000 transactions an hour through off-

CONTINUED ON NEXT PAGE

When Xerox, IBM and the phone company merge, we'll have some real competition.

Wang admit it. At least three other companies can bring you office automation.

Trouble is, they can only do it between them. Because when it comes to data, word, image and voice processing, only Wang has all the products. Along with the technology to combine them on one, resource-sharing network: WangNet.

Our systems are integrated. To us, the telephone, the copier, the computer and the filing cabinet aren't separate pieces of equipment.

They're pushbutton extensions of your desk.

From a single workstation, you can type a memo or file reports electronically. And run a program or make enquiries on a remote computer. And send and receive voice messages or electronic mail via WangNet.

Unlike our competitors, we don't believe networks should be limited to words and data. Or to the limits of one manufacturer's technology.

Which is why WangNet is designed to handle everything from computer systems and satellite communications to video and voice transmissions.

Today, only Wang can offer you a total office automation system.

And a system, it seems, our competitors are finding hard to beat.

WANG

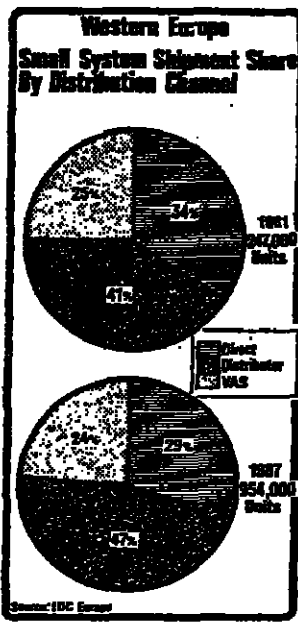
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COMPUTERS IN BUSINESS IV

The minicomputer is alive and healthy, reports Ray Snoddy, but competition is intensifying

Challenge of the middle ground



MUCH OF THE glamour and publicity—and many of the personalities—may have shifted to the home computer but the mini computer, though showing some signs of early middle age, is alive and healthy. It is even promising sustained and in some areas exciting growth.

Led by the superminis, the 32-bit mainframe equivalents, the overall value of worldwide minicomputer shipments by U.S. manufacturers are expected to grow at a compound rate of 20 per cent a year over the period 1981-1986 and rise in value from \$6.2bn to \$15.4bn.

But within the overall expansion the rate of change in an already fast moving market is accelerating and the competition is becoming more intense. Not every mini manufacturer may survive the course to the end of the decade.

Even dictionaries of information technology published this year still confidently define a minicomputer "as a computer

of intermediate size and computing power between a mainframe and a microcomputer." In reality the old distinctions between micro, mini and mainframe computers have become increasingly blurred.

Mr Bill Passmore, marketing manager in the UK for Digital Equipment Company (DEC), the company which created the mini and is still the market leader, says he simply does not know any more what a mini is.

At the lower end of the distinction has lost much of its meaning as super minis, professional personal computers and small mainframes are in the fight for the same market. At the upper end of the range the super 32-bit minis are taking on the central mainframes as never before and catching the customers migrating downwards as the desire of gravity shifts away from the large general purpose machines. DEC prefers to be known as

"the world's largest small computer company" rather than the number one mini manufacturer and the changes in computing power in its product range demonstrate how the old distinctions have lost their clarity as computing power has dramatically increased with falling prices.

When he first joined DEC in 1970 Bill Passmore was selling a PDP mini—DEC's basic mini workhorse which in updated versions is still going strong

for about \$80,000. A chip four times faster is now available for several hundred pounds for use in other products such as robots or in industrial control.

The same PDP chip can be found in the new DEC professional personal computer which began arriving in the UK in bulk for the first time last month.

At the upper end of the market DEC plans to launch later this year linker clusters of its VAX superminis which, it believes, will more cheaply and flexibly handle as many millions of instructions per second (MIPS) as all but the most powerful mainframe computers used for large-scale modelling.

Although there will probably still be real growth for the traditional medium strength medium-priced mini it is on either flank of the mini market where the most dramatic growth is likely to take place.

International Data Corporation (IDC) in a recent study of the West European market for minicomputers noted that the dynamics of the market showed some contrasting fortunes.

"Both the supermini and the micromini are destined for the most dramatic growths—estimated on an average annual basis to be 25 per cent and 39 per cent respectively. By comparison, the average growth of 7 per cent in the traditional minicomputer revenue seems pedestrian, although during 1982 the market will still be worth an estimated \$960m." This compares with an estimated \$5.2bn for the total West European market in that year.

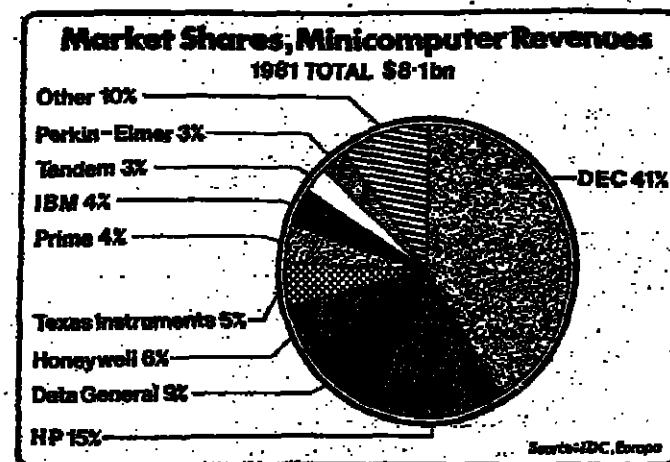
IDC says that the undisputed market leader in Western Europe is DEC, with over 25 per cent of revenues generated, and is in first or second position in all countries.

Pole position goes to Siemens in West Germany, SEMS in France, and HHS in Italy.

But although DEC is the clear leader and believes it has read the market right, the process has not been effortless. In the quarter ending January 1 this year total revenue was just over \$1bn, but pre-tax profits slumped from \$165m to \$98m. There has also been a pay rise deterrent for six months.

The company says the fall in profit was partly due to recession but mostly caused by increased advertising and research and development spending.

DEC now believes it has the machines to protect its flanks as the expected slow decline of its middle range as a proportion



of total sales continues.

For many applications—particularly banking—the PDP family is more cost-effective than the VAX. Last month Barclays Bank ordered 150 PDP 11s and it is planned to install similar systems in up to 500 branches over the next two years.

For some companies there is a danger of becoming more isolated in the shrinking middle ground. Data General (DG), third in the mini market, with sales of \$900m in the year to October 1982, admits that it was slow to read the coming changes.

"But that was three years ago. We now have the fastest 32-bit system," says Mr Bill Cadogan, Data General's marketing manager for the UK and Ireland.

The company believes it has come from behind to catch the lead in one of the most significant mini races—the contest to put "mainframe" computing power in an easily accessible form on the desk of engineers, scientists or managers.

Earlier this year DG announced the arrival of the "megamin" —the Eclipse MV/1000, which it claimed "offered the highest performance of any virtual memory 32-bit computer available."

The machine was said to be twice as fast as the company's one previous largest machine and only 20 per cent more expensive.

Prime, with a good reputation in providing minis for science and government, was another company in danger of being outflanked at both ends of its market.

Late last month it signed an agreement with Convergent Technology of California, to purchase and jointly develop intelligent work stations.

The scale of the coming competition can be gauged from the fact that Hewlett Packard, number two in the mini market, has also weighed in with its own supermini, which it says will deliver "mainframe" power to the desk top for \$20,000.

The company, which is also well positioned with a range of professional personal computers, believes that such a machine will alter the nature of computing at the upper end of the market as the personal computer has done at the bottom.

The machinery is, however, becoming less important and computer companies are increasingly being asked to deliver total solutions for the office and manufacturing needs of businesses.

One of the most dramatic areas of growth and competition is to be the automated office. Pilot schemes are already in operation and many believe that this year significant decisions will be taken by major companies to go ahead with the integrated automated office, to be driven by minicomputer power.

Other areas of growth are expected to be Computer Aided Design, when the West starts to pull out of recession, and computer integrated manufacturing.

The mini companies which will maximise the potential for such growth are likely to be those with the greatest skills in handling distributed data and in achieving the most convenient links between different computers, in either the office or factory.

New pressures on the mainframe sector

CONTINUED FROM PREVIOUS PAGE

loading work from the central processor onto subsidiary processors.

UDC commented earlier in the year: "Univac, Honeywell and CDC will compete with IBM in the high end minis war but Burrough is not yet committed."

In fact, Burroughs is attacking IBM's market but it is looking to supplement and enhance IBM data centres rather than displace IBM machinery.

Sperry Univac is expected to launch a new family of top end machine with greatly enhanced fast storage capabilities within the next two months or so.

But IDC warns: "Let any need a reminder of IBM's size, consider that at its average 12.4 per cent growth rate, Big Blue (a reference to the colour of IBM's mainframe cabinets) adds nearly the size of a Digital Equipment (the world's leading minicomputer manufacturer) to itself every year."

It goes on: "1981 and 1982 have seen a steady stream of questioning over the BUNCH's future as this group has been slow to move into new, fast-growing markets. Yet the data

shows that over the period 1976-1981, the BUNCH have grown faster than IBM.

"This pattern will change as revenues for the BUNCH last year are relatively flat and earnings are generally down, whereas IBM is doing well."

"The next few years should be good ones for IBM. With its continued emphasis on purchase and its desire to pursue any and all markets, IBM is well positioned to ride its 308X (its family of big machines) product cycle for substantial growth, especially since the Reagan administration has lifted the anti-trust monkey off IBM's back."

IBM has, in fact, invested billions of dollars in new manufacturing capacity and techniques which means it can make its hardware at lower cost and reliability than almost any other computer company.

It has placed great faith in a piece of technology it calls the thermal conductor module—basically a metal box cooled with chilled water into which can be packed hundreds of highly integrated silicon chips. Its reasoning is that it is a

TOP TEN
THE WORLD COMPUTER
INDUSTRY

	1981 Revenues	2-year Growth %
1 IBM	\$25,111m	14
2 DEC	3,856	31
3 CDC	3,131	19
4 Burroughs	2,934	11.1
5 NCR	2,638	14
6 Sperry Univac	2,718	12
7 HP	1,875	34
8 Fujitsu	1,811	9
9 HDS	1,774	11
10 ICL	1,487	16
Total	\$42,285m	15

Source: Hewlett-Packard

simple matter to repair or upgrade a machine simply by uncoupling a single module which might have the processing power of a mainframe of earlier years—and replacing it

with another.

What do customers think of it all?

One likened business data processing to a pyramid divided horizontally into three. The top section is computing for strategy—the kind of information and processing needed by top management.

The second section is computing for tactics—essentially the needs of middle managers. The third and broadest section is computing for operations—required to meet the needs of accountants and so on.

The operations section is growing fastest and is chiefly serviced by the personal computer industry—now that IBM, Wang and DEC have made it respectable.

The second section is serviced chiefly by the distributed minicomputer manufacturers while the top section is the preserve of the mainframe.

But it all points to the need for mainframe power. To illustrate the computing complexity needed for even simple operations, Dr Louis Robinson, director of university relations

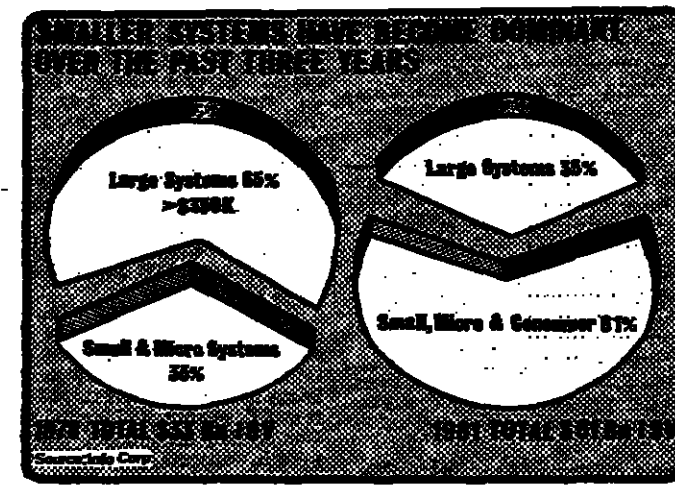
for IBM, is fond of pointing out that to inquire of an airline booking system whether a particular seat on an aeroplane from London to Paris is free requires some 250,000 calculations.

Computer systems in the future will require substantial computing power to handle the very sophisticated software now being planned and written to make the job of computing simple for the non-computer specialist.

There are for example, program creation programs like Burrough's Linc and Univac's Mapper. There are Expert Systems which make it possible for the businessman to hold an "intelligent" dialogue with the computer, and there will be editing programs and graphics programs of much greater power than those available today.

The mainframe business is changing shape under these new pressures but the continued need for massive, centralised computing power ensures the dinosaur will survive—and evolve.

Alan Cane



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We didn't set out to earn a reputation for being different. Or even to make a name for doing more.

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But one thing led to another and today you probably know us as one of the biggest computer companies in the world.

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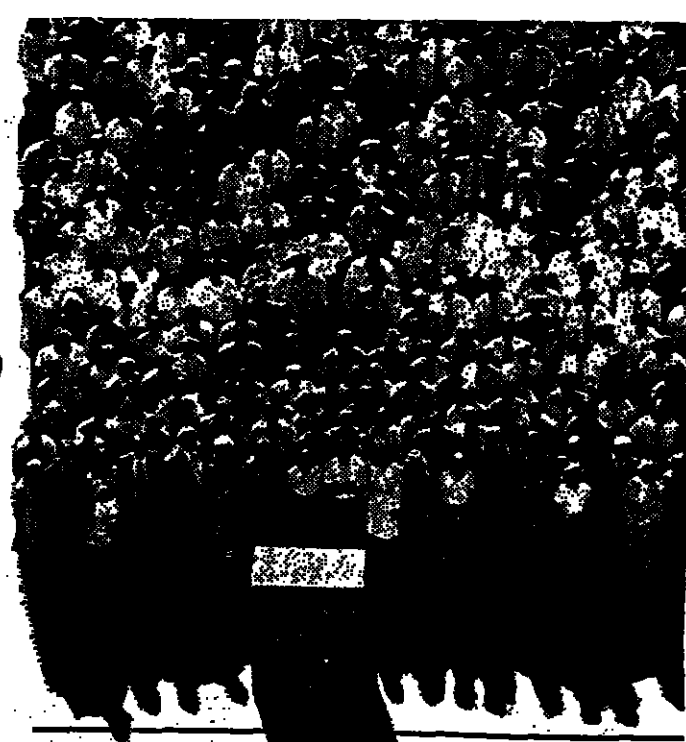
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digital

Wang, the U.S. computer company which leads the office automation sector aims for \$5bn in revenues by 1990

Coming to terms with success

WANG, THE U.S.-based computer company, made its name and its fortune in the office. Now, with revenues running at over \$1bn a year, it seems to have avoided most of the problems of success which beset fast-growing companies and is not making its target of \$5bn in revenues before 1990.

Dealing with success has frequently proved a great challenge for small computer companies as achieving it. Often, the company's success is based on a single product or a few key customers. When the company reaches revenues of \$1bn, by that definition, Wang is still on the right track.

Wang's future lies in the integration of office products into single systems.

It has continued to grow by an average of 60 per cent a year during a recession which has hit other manufacturers badly, yet it is not complacent. Mr John Cunningham, Wang's newly-appointed president, is fond of illustrating what would happen if the company continued to grow at that rate—by 1992, he explains, revenues would be almost \$100bn.

"That type of growth is unsustainable. In aiming for revenues of around \$5bn by 1990, we are looking at a tenfold growth in 10 years—roughly 20 per cent to 30 per cent growth a year," he argues.

It is a plan that pleases the financial world. Only two years ago, industry analysts were warning about the company's long-term debt—high compared to IBM or Digital Equipment—and poor operating margins—pre-tax margin in 1982 was only 11.7 per cent. IBM sets the standard for

the industry at over 20 per cent.

The company set to work to improve margins and now the analysts are happy. Daniel Burnham Lambert, for example, in recommending Wang stock, argues: "We expect margins to improve as operations are consolidated at more efficient rates of growth."

It says: "Wang continued to report exceptional earnings in a weak economic environment. We expect strong growth to continue in 1983 with earnings of \$2.50 a share, a 50 per cent increase over \$1.75 a share in 1982."

So Wang seems to be safely through the billion dollar barrier, but that brings its own difficulties. The company is in its 31st year but revenues in 1978 were only \$18m; now it employs 19,760 people and Mr Cunningham expects to hire another 4,000 this year.

The recurring theme at Wang's Lowell, Massachusetts, headquarters is the difficulty people there find in coming to terms with the fact that it is now a very big company.

It has meant a considerable change in management style. Wang is the creation of one individual, Dr An Wang, who ran the company single-handed through most of its life. Two years ago the management began to loosen out as John Cunningham, then executive vice-president, Fred Wang, son of the founder, Harry Chou, treasurer, and John Kropper, senior vice-president in charge of manufacturing, set up an executive management committee.

Now the process has gone one step further. Dr Wang has stepped out of the limelight but remains chairman. Cunningham has become president and Fred Wang has taken charge of research and development.

These changes are more profound than might appear at first sight. From the early days the company's reputation as an innovator has rested on Dr Wang's technological brilliance and his exquisite sensitivity to the marketplace.

He started the company on money made by selling his patents on magnetic core memory (an early form of high-speed computer storage) to IBM. Now Wang sees IBM as its chief competitor.

Dr Wang specialised first in

consistency in memory devices and machine tool numerical control before bringing out the first programmable cassette-based desk top calculator in 1965.

In 1973, the company introduced its 2200 series of small business computers which proved successful (40,000 systems installed). The real turning point, however, was the introduction in 1976 of its first word processing system based on television-like video screens coupled with some of the most powerful word processing software ever written.

Alan Cane reports from Wang's centre of operations at Lowell, Massachusetts.

The next year, the company moved closer to its origins with the introduction of a very powerful virtual memory computer family, the VS series, which offered mainframe capabilities at minicomputer prices.

More recent products have included the Office Information System range (OIS) dedicated office word processing and information handling systems, the Alliance system which integrates word, data, audio and image processing in a single package, the Professional Computer, Wang's offering in the personal computer marketplace and Wangnet, a communications system for voice, data and image.

So is Wang falling into the trap of offering everything to everybody? "No," says John Cunningham. "If our people invent the best digital technology, we would put them on the head but tell them 'It's just not our strategy'."

And Dr Wang says: "We are an office automation company and that is what we want to do. There will be no shift in our direction."

Can the company maintain its innovative flair without Dr Wang exerting his benevolent dictatorship? Fred Wang recalls: "When I was still at school, my father asked me what I thought the most difficult part of the business was."

"He rejected my ideas that it was making a profit or

developing new products. It was keeping the people happy, he said. And now I agree with him."

"We believe that our people will figure out best what needs to be done if we can ensure that they are enthusiastic about the time they spend here."

And it is certainly true that there is a dynamism about the massive grey building in Lowell with its floor upon floor of tiny partitioned cubicles, each with its mandatory Wang video terminal, which suggest that the flame is still burning brightly.

What Wang is doing, in fact, is to maintain its market niche—the office—and limiting innovation to that niche.

Its direction for the future lies in the integration of office products into single systems. John Cunningham says: "We have a corporate systems orientation. This is where most office automation companies have failed up to now; they have failed to integrate their products into one system."

But it would also be fair to say that Wang does not have all the answers. Mr Duke Sullivan, who runs the Lowell Advanced System Laboratory—a test bed in headquarters for office systems—agrees that there is no clear view of what the office of the future should look like.

"Perhaps we need a Henry Ford of the office," he says. "I expect there will be multiple solutions. Some people will find it convenient to work at home; others will want to work in small groups, and so on. The technology will allow us to do all this—but only if we allow it. We are not in a technological imperative."

For the future, Wang is working on greatly improved versions of its text editing software, the facilities which really distinguish between well-constructed word processing equipment and microcomputers with word processing packages tacked on top.

The ergonomic keyboard it introduced with its Professional Computer will soon become standard across the entire product line.

And Mr Cunningham says that the first product for the executive without typing skills or the desire to learn them will be seen soon.

"We have the opportunity to set the standard in office auto-

mation for unstructured data devices for people who will never play with keyboards. We will see the first of these within 24 months."

It will all depend on effective software. The problem of software productivity is so acute that Dr Wang established the Wang Institute of Graduate Studies in 1979 to create a centre of excellence for software engineering—the development of better ways of creating good software. Now there are 35 students using a galaxy of equipment provided free by Wang, DEC, Prime and Apollo.

The shape of the office of the future may be uncertain but it looks a good bet that equipment labelled "Wang" will be part of it.

Many small businessmen are frustrated in their selection of the right hardware and software, as David Churchill reports.

Key questions for purchasers

BUSINESSMEN wanting to buy a small computer will find that the retail market for micros is still in some confusion with no clear-cut retail patterns firmly established. This is perhaps not surprising given the dramatic increase in both the supply and demand of the small computer market.

There remain, however, two key problems for the business user of micros (as distinct from the hobbyist user). First, the businessman needs to know what to buy that is best for his purposes, and second, he needs to know where to buy both the hardware and software.

A recent survey of some 1,200 businessmen, carried out by the Romet consultancy, observed that "businessmen, as distinct from home hobbyists, educationalists and the like, must concentrate on running a successful operation; relatively few wish to risk the serious consequences of pouring hours down the bottomless black hole of do-it-yourself computing."

Finding out what is the best type of hardware and software for their particular purpose can be a frustrating experience for many small businessmen with no experience of data processing. The Consumers' Association, for example, found that anyone buying a small computer could find the experience "very frustrating."

One problem the Association identified was that some of the staff in the specialist computer shops which have mushroomed over the past couple of years were "not as knowledgeable as might be expected."



Dr An Wang, left, chairman of the board. He received his university education in Shanghai, China and moved to the U.S. in 1945. He began his computer manufacturing company in Boston. Mr John Cunningham, right, is the newly-appointed president of Wang Laboratories, Lowell, Massachusetts, and is responsible for 15,000 Wang employees around the world.



This is a problem faced by many businessmen who are bewildered by the array of options open to them. The first practical step is to peruse the many small computer magazines now on the market to gain some idea of the jargon and so on (so that you do not appear "green" when in the shop) and then to have some clear idea of what you want the data-processing capability for.

Reputable retail outlets will be able to offer advice on the best system for your purposes, although there is always a danger that there may be attempts to palm off slow-moving stock on the unsuspecting business customer.

The right equipment

Where the business user should buy from is equally a problem, since shops of all types now seem to have a foothold in the micro-computer market. Boots, W. H. Smith, Dixons and Rumbelows all retail small computers, for example. It may be that the businessman who knows exactly what he wants may be able to find the right equipment in these shops at lower prices.

The main specialist retail outlets that have emerged so far include the Tandy operation. Tandy is the largest retailer of home computers in the UK, with some 23 shops in this country as well as a further 94 dealerships.

The Currys electrical goods chain has also set up a chain of small specialist shops selling small computers, and is reported to be doing very well. Total

sales of specialist computer shops were estimated at some £75m last year and are expected to top £100m this year.

This target will be helped by the planned expansion of the California-based Computerland operation in Britain. Computerland has avoided the UK until recently because another company had the same name. However, there are two Computerland stores now open in Southampton and London.

Computerland plans to open up some 40 outlets in Europe this year, of which at least 10 are expected to be in the UK. Mr William Millard, the company's chairman, says that "I expect the market for personal computers in Europe to explode."

Computerland's expansion will be franchising. For a fee of around 5 per cent of the annual turnover of the store, the franchisee gets advice, training, the economies of scale involved in buying some 3,000 products centrally from over 150 manufacturers.

"Another major area of retail distribution is mail order, although there has been problems with some of these distributors over delays."

"Members buying by mail order were often involved in a long wait for delivery," the Consumers Association points out. In such a rapidly developing market, however, distribution patterns are certain to change significantly in the coming months. Such change is likely to see more chains become well-established and, hopefully, offer a better service for the business customer.

NEW GENERATION DISTRIBUTED MODELLING

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AP "Development time and effort has been greatly reduced since the introduction of Wizard which has added a new dimension to our flexibility to respond to reporting format changes." **D.C. WORT** Group Chief Accountant

BTI "Very adaptable business modelling system." **RON FAIRCHILD** Chief Accountant

EOC International "I was very impressed by the speed with which we were able to develop the budgeting system, working to a tight deadline, Wizard and I, we did it together!" **MICK MILLER** Market Planning

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After just eighteen months Wizard is already being used by over 250 large organisations in 10 countries.

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COMSHARE
MAKING THE COMPLEX MAKE SENSE

COMPUTERS IN BUSINESS VI

A computer eases life for one newsagent

How good news came to Martin's

THE TRUD of a newspaper as it falls through the letterbox is an early morning sound as pleasant to most people as the first taste of coffee—regardless of whether it heralds the arrival of the Sun's Page Three or the Share Information Service of the Financial Times.

The job of the newsagent who gets it there, on the other hand, is far from enjoyable unless he likes getting up in the dark, laboriously checking stock against expected wholesale deliveries, logging sales ledgers, adding up accounts by hand and dealing with disgruntled customers whose monthly bill includes the price of a Bano never received.

Happily for Bob Tuttle, manager of the Stevenage branch of Martin's Newsagent, life has been a lot easier than that since December thanks to GoodNews, a small computer system which has both speeded the distribution process and improved the efficiency of his news stock control and internal accounting procedures.

Martin's have 510 branches up and down the country and following the successful Stevenage pilot project over the last few months, the plan is to install the GoodNews system in about 200 branches.

And through Martin's Halo, a joint company set up with the Oldham-based manufacturers Halo, the idea is to capitalise on the extensive software development of the past couple of years and market the system to the nation's army of independent newsagents.

In Bob Tuttle, meanwhile, Martin's seems to have chosen the ideal "guinea pig" to test the new machine, a 64K micro powered by Sony disc drives, featuring a 5in VDU, and incorporated into a box little bigger than a normal cash register.

A newsagent for many years, Tuttle was on his own admission sceptical at first about the new technology but now wonders how he could have managed without it.

Initially I didn't believe it could do everything that was claimed

"I admit that initially I didn't believe it could do everything that was claimed. But the effect on my working day and on my staff has been tremendous. Our old methods were time consuming, the work was mundane and partly as a result of this we tended to make mistakes."

"We get into the shop at around 5 am to await delivery of the morning's stock of dailies, weeklies, monthlies and part-weeks. Each item has to be checked but whereas previously this involved four separate logging processes, the computer now automatically checks all the information, prints out lists for the newsboys and girls, and thereafter does a lot of other processing, including preparing

statements and invoices."

Tuttle's old manual stock control and book-keeping systems—which he retains in the back of the shop, presumably for the benefit of future historians—had to cope with the orders of some 1,500 customers and about 4,500 different daily combinations of customer and publication. In all, he handles some 600-700 titles.

Among the daily chores were keeping track of which publications had arrived from the wholesaler, which customers did and did not take alternative newspapers in the event of short supplies; remembering to stop newspapers during holidays and in some cases keeping periodicals until customers returned; taking note of price rises and adjusting each individual account; and stopping delivery when accounts remained unpaid at the end of a five-week period.

Says Mr Jeff Hodgson-Jones, a director of Halo: "The problem was that there were effectively two separate manual systems—one for checking the deliveries in and one for doing the accounts. There was nothing that automatically transferred information from one to the other, with the result that it had to be done by hand."

"This is what we have overcome with GoodNews, which was designed very much with the newsagent's routine and organisation in mind."

Bob Tuttle adds: "With the old system we tended to keep a lot in our heads and write it down later. One of the biggest drugstores was bringing the balances forward each week and going through every customer when a price went up. Whenever I put someone new on the job it was fine for three months but after that they usually got fed up and started making mistakes."

The GoodNews system starts work with Tuttle when deliveries arrive from the wholesaler. He still has to be at the shop at 5 am, but now he simply keys in the number of newspapers and periodicals as they come in and leaves the machine automatically to print out details for the newsboys and girls.

This, of course, is likely to



Mr Bob Tuttle (left), manager of the Stevenage branch of Martin's, with Mr Alan Campbell and Mr Jeff Hodgson-Jones, directors of Halo, manufacturers of the GoodNews system, seen here.

vary from day to day, so the programme not only takes into account customers' orders but unusual "days" such as holidays or unpaid bills.

"The rounds lists can be printed in a variety of sequences," says Tuttle, "either pre-set or interrupted, according to convenience—alphabetically, geographically or by newsboy number. The system only itemises goods in and customer deliveries for that day, automatically charging them at the same time, so customers cannot be billed for goods not delivered or receive their newspapers when they are away."

The system sits on the counter and acts as a point-of-sale facility

The GoodNews system—it sits on the counter and also acts as a point-of-sale facility for other goods—can update customers' accounts, print statements, invoices and reminders, bring forward weekly balances, log price changes and amend daily sale or return orders to wholesalers.

"It now takes less than half a minute to key in a price change and GoodNews does the rest," Bob Tuttle says. The point-of-sale facility, however, remains available throughout and comes into its own particularly when customers are paying their accounts.

Each one has his or her own account number which is keyed into the computer; an itemised statement appears on the VDU and when the money is paid over customers get a receipt showing exactly what they have

paid for.

The system can print reports on products, suppliers and customers so that among other things the newsagent can check invoices against deliveries, products by type and frequency and account restarts. Enhancements planned for later this year will allow the newsagent to break down non-newspaper sales into a number of broad categories and a facility to help with VAT accounting.

Bob Tuttle says that learning to use the system was fairly straightforward—initial training was provided and manuals supplied. "The machine has saved a lot of error, aggravation and fatigue," he says.

"Quite apart from the fact that one compact system replaces all the old ledgers and the cash register—which is important when working in a limited space—it saves time and helps me do my job better. Inevitably, customers benefit by getting a more efficient service while the staff spend more time in the shop."

Martin's managing director Peter Martin says the company looked at a number of existing systems when it first hatched plans to computerise news administration 18 months ago. The idea of marketing GoodNews to independents in the trade only crystallised once the pilot project had been declared a success. "We think the stock control, VAT and bookkeeping programmes will be of most interest to the independent trade."

GoodNews at the moment is a "stand alone" system. In the long term, however, Martin's intend to computerise their stock control, a task which could well be achieved by linking the new micro to the company's mainframe computer.

Tim Dickson

Case history: Glaxo Pharmaceuticals

A system that links together 14 sites

AS FAR AS any of the 750 users of computer terminals in Glaxo Pharmaceuticals is concerned, the company might as well be operating on a single site. The users range from the storeman checking stock availability to a director examining an analysis of the previous day's sales. In practice they may be on any one of 14 sites throughout the UK from Montrose in Scotland to Greenford in Middlesex.

Most of the key information within Glaxo Pharmaceuticals is now available in seconds from more than 500 terminals up and down the country. Until a few years ago it could have taken days or even weeks to extract and collate much of the information managers now take for granted. The system caters for a host of needs from basic financial information, stock and production levels, to word processing, electronic mailboxes and even a daily news summary.

Glaxo Pharmaceuticals, a large British subsidiary of the UK-based Glaxo Group, embarked on a major change in its computer systems in 1978. The reason for the change was reorganisation of the company. Glaxo Operations UK was established from three subsidiary companies manufacturing and marketing pharmaceuticals in the UK and exporting to other Glaxo subsidiaries and third parties. The three companies, each operating in different sectors of the market, were Evans Medical, Glaxo Laboratories and Allen and Hanbury.

Glaxo points out that all three companies used the same basic skills and techniques in manufacturing, marketing and administration so there were opportunities to improve productivity and efficiency by combining their activities under one management.

The main benefit expected of the rationalisation was to reduce administration and overhead costs through an advanced computer-based information system. Up to that point the three subsidiaries had been responsible for their own planning and control systems. Each had its own data processing, mainly based on ICL mainframe computers but also using equipment from various other sources including IBM, DEC and Hewlett-Packard.

GoodNews at the moment is a "stand alone" system. In the long term, however, Martin's intend to computerise their stock control, a task which could well be achieved by linking the new micro to the company's mainframe computer.

Tim Dickson

management services at Glaxo Pharmaceuticals, explains: "We had to produce a computer system to meet the new organisational requirements. The existing systems did not have the features or the communications facilities which we needed."

"We felt we wanted to put the processing power where it was needed, where as it had previously been centralised at the mainframe. As we wanted something which was on-line and easily available on all sites, we concluded we needed a network of minicomputers."

The full benefits of such a system are not easy to measure

The company also took the opportunity of the reorganisation to build a framework for progressive office automation rather than just changing its data processing. Glaxo's search for the right products and systems was wide-ranging but the number of companies which could provide a solution to its problems at the time were few.

It began by approaching its main computer supplier, ICL. At the time it did not have the suitable hardware or software for Glaxo's needs. The company also talked to IBM, Honeywell, Hewlett-Packard, Digital Equipment (DEC), Data General, Prime and Univac.

Glaxo finally opted for Hewlett-Packard on the grounds that it could demonstrate the two most crucial aspects of the system. These were the database management system and the network communications software. "Hewlett-Packard was the only company at the time which could give us a working demonstration rather than offer promises," says Mr Lee.

The first system was installed in Greenford at the end of 1978. Now Glaxo has 16 of Hewlett-Packard's HP 3000 minicomputers in six locations serving 14 different sites in the UK including Speke in Merseyside, Barnard Castle in County Durham, Ulverston in Cumbria and Ware in Hertfordshire. The computers are connected by 24 high-speed data links provided

by British Telecom. The new system meant that the company could organise and plan its activities as if it was operating on one site instead of 14. It also meant that when the company reorganised again in 1981 creating three independent companies, the system was flexible enough to cope with the change.

The system is currently being used for 90 per cent of Glaxo Pharmaceuticals' data processing needs. Only one ICL mainframe remains in the company and is used for functions where there is no need for "on-line" services.

Application of the system now includes: management accounting, production costing, debtors analysis, forward requirements, order processing, production planning, invoicing, sales forecasting and budgeting and financial modelling.

Glaxo points out that it is not an easy task to introduce a complex system to all levels of staff and it has involved considerable training. "Radical new concepts cannot be assimilated quickly by a large group of staff and the training requirements tend to be underestimated," Mr Lee says.

The full benefits of such a system are not easy to measure because many are intangible—such as the advantages of giving managers more information more quickly. Installation has coincided with a substantial growth in Glaxo's business and Mr Lee speculates: "Could we have sustained this rate of growth without such a system?"

There are a number of plans to extend it still further. The number of terminals is expected to grow until eventually they may be as commonplace as telephones. Mr Lee also wants to integrate the private speech telephone network which links the 14 sites with the data network with common switching.

Glaxo is also looking at introducing a fibre optic switching loop to link some of the terminals and computers which would offer greater efficiencies and flexibility. And microcomputers which are increasingly being used within Glaxo factories are also to be linked together and then connected to the main network thus establishing several layers of computer network.

Jason Crisp

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COMPUTERS IN BUSINESS VII

Case study: The Trustee Savings Bank

Why TSB went outside

ONE DAY a Trustee Savings Bank manager might ask Peter Stone for a run-down of the operational costs of one of the banking group's computers over the past three years.

The following day the same manager might ask him for a projection of computer costs for the next three years. A third request might be for an assessment of the trade-off between using more mortals and investing in more automated facilities.

For Stone, who is finance manager of TSB Group's Computer Services, these would be routine enquiries which are the stuff that modern-day sophisticated "number crunchers" are made of.

The TSB, which is the fifth largest banking group in the UK, with 11.5m customer accounts, assets of more than \$6.5bn and 24,000 employees, has no shortage of sophisticated equipment; it runs Burroughs and Univac mainframe computers for customer accounts, an IBM system for central cheque clearing and Digital Equipment Corp. machines for certain in-house time-sharing systems.

In fact, it was the first large-scale bank enterprise in the UK to use on-line real time systems with computer terminals some 10 years ago, a facility which can provide most of its 6m customers with an immedi-

ate update of account balances on demand.

The TSB, which has been a substantial user of computers since the 1960s, has an internal financial accounting facility—common to most banks—but which has been extended to supply management information relevant to both financial and manpower planning on an in-house time-sharing basis.

It also does research and development into any software and hardware that the group might want to use and runs a separate unit, which Stone is in charge of, providing the financial information necessary for determining policy towards computer facilities.

Yet, in spite of all this sophistication, when Stone wants to come up with what is essentially routine, albeit complex, management information, he chooses to use the facilities of an outside computer bureau—two in fact.

He uses the London Business School's computer for what he describes as a "mathematical statistics package" for business forecasting and Comshare, one of the UK's 10 largest time-share computer services companies, for management information purposes.

Stone explains: "When you're dealing with a large-scale job on the computer—tens of millions of transactions and processing a payroll of many thousands of

employees—the work is more or less a production line function.

"When it comes to producing information for management purposes, it becomes apparent that you have to use data that is convenient for the people using it."

Stone says the information readily available through exist-

ing programmes is "not in a suitable form for management purposes."

One of the main problems with mainframes, he says, is that they are remote from management.

Stone says that to go outside to a time-sharing facility it is essential to have access to three main resources—efficient software, machine reliability and good support for writing complicated programmes.

"If you can get these three things, one ought not to run into major problems in creating a good management information system."

For Comshare, the TSB is one of the largest of its 1,600 customers; at any one time it



Mr Meyer Sopher, founder and managing director of the British Distribution Company—devoted to on-line computing.

How BDC refined its tuning

THE BRAND NEW minicomputer arrived at the premises of the British Distribution Company, a north London electrical wholesaler, in February 1978.

When the annual turnover of the company was \$3.5m. Now five years later, despite the recession, BDC is this year expecting a turnover of between \$26 to \$28m and is planning further expansion.

The extensive use of interactive on-line computing on 60 terminals linking BDC's three sites has not single-handedly created such growth. The company aggressively pushes brand leaders, and goes in for unit pricing with special discounts for only the largest

key accounts.

The marketing effort is underlined by a monthly magazine for all customers giving details of the latest prices, which products are about to be heavily advertised, and which are selling fastest.

Mr Meyer Sopher, founder and managing director of BDC, who has built it up from a company with a turnover of \$30,000 a year, 20 years ago, is convinced however that he could not have coped with the present rate of growth without a heavy commitment to on-line computing.

Mr Sopher has spent \$110,000 on his computer system. It is based on a Computer Tech-

nology Ltd (CTL) 8046 mini plus a backup to avoid the danger of any down-time.

"Without the computer system we would have needed at least 200-250 extra people costing \$250,000 a year," says Mr Sopher who employs 180. Even if the right people could have been found and trained quickly enough BDC would have been a much less efficient company, he believes, for virtually every aspect of the business is run on the computer.

It holds and continuously monitors details of every item in the company warehouses. More than 8,000 product lines from more than 300 suppliers are held, covering everything from lighting to domestic appliances and electrical equipment for contractors.

Each trade counter has a terminal on the desk giving instant details on availability and price.

When an account customer phones an order his credit rating and the history of the account can be checked at once on the screen.

When an invoice has been issued at any trade counter the information is instantly available on the screen of 25-year-old Mr Joseph Sopher, the director in charge of both sales and purchasing.

Mr Joseph Sopher can watch on his desk the changing fortunes of the company minute-by-minute and see which lines are selling particularly fast together with the profit margin involved.

"It's very exciting during the Christmas period. You can watch the sales totals mount second by second," he said.

Accurate knowledge of what

is selling and what isn't means that BDC can fine tune their marketing almost on a daily basis and offer special discounts and promotion campaigns.

The on-line computer power means that bad debt is also a minor problem at BDC. Staff are warned immediately when a customer's credit limit has been reached. Even if purchases were made simultaneously at different BDC warehouses.

On a turnover of \$15m bad debt totalled \$3,000 and although at the company expanded Mr Sopher relaxed his vigilance a little—it was \$30,000 when turnover reached \$20m—he hopes to get the figure down to \$15,000 this year.

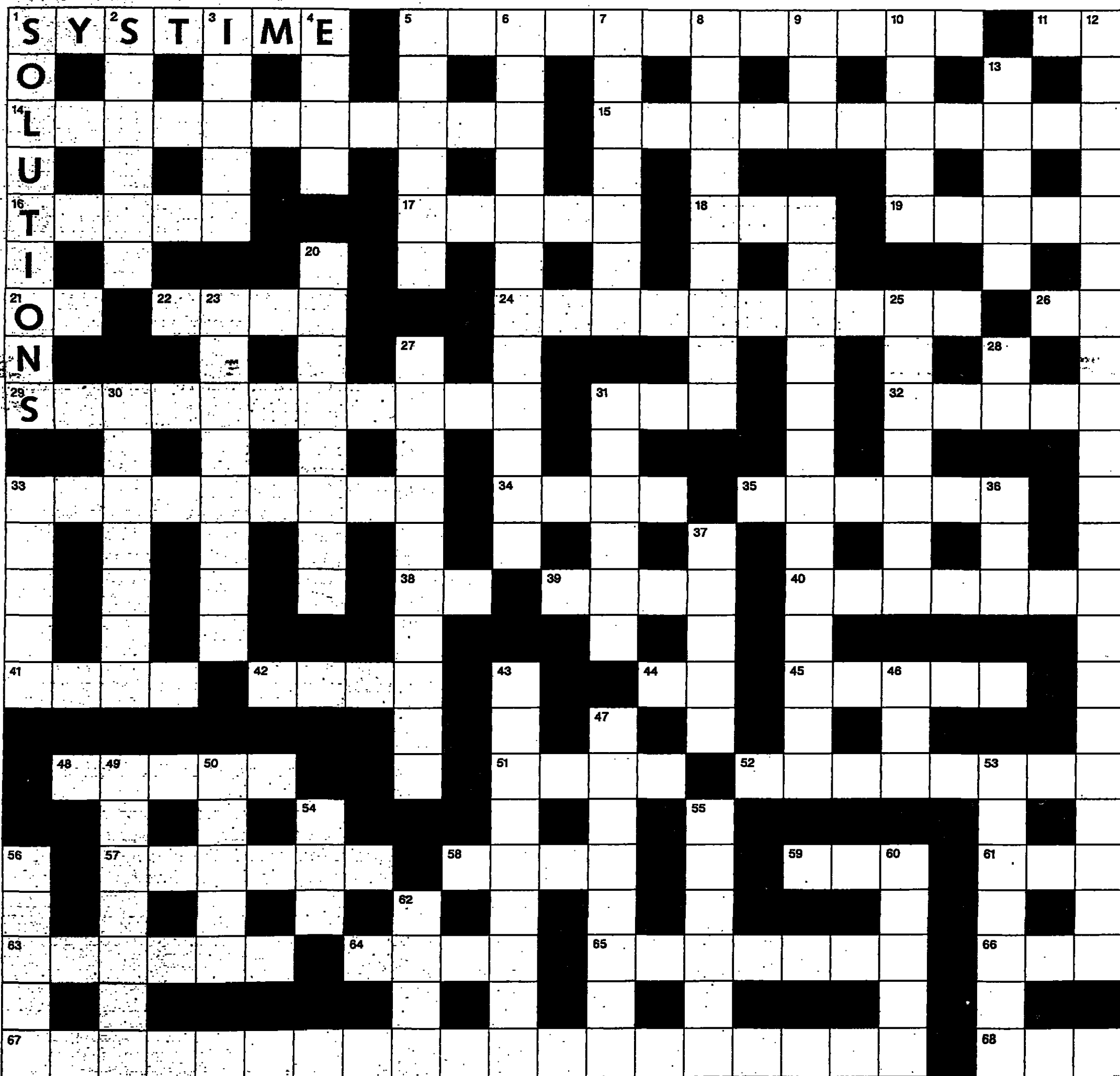
Most of all the computer system allows BDC to combine a large stock with fast service and delivery. The distributed computing power will also allow the company to expand to other parts of the country by setting up local trade counters while still operating from their large central warehouse in London.

BDC will probably move over to the new CTL non-stop computer, designed to take on Tandem of the U.S., and put more effort into automating its warehouses.

But one thing is unlikely to change, according to Mr Rysiek Tomczek, marketing manager, the company's devotion to print. The printed monthly magazine gives the "longevity" of message the company needs.

The layout of the BDC Times, and mid-monthly supplements, however is of course designed on a computer graphics machine.

Raymond Snoddy



ACROSS

1. Britain's largest supplier of turnkey computer systems (7)
5. Amiable quality of your Systime software (4,6)
11. The constables personal computer? (2)
14. Leave their mark a line at a time (4,7)
15. Even a lumberjack can't do much in this condition (3,6,2)
16. Deal with Systime and this screen won't complete a con (5)
17. Mix, mingle (5)
18. Feeling sheepish? Try Random Access Memory (3)
19. Replace data in a storage device with some standard characters, e.g. zero or blank (5)
21. Short operation? (2)
22. Sure to become an operator (4)
24. No difficulty getting in (4,6)
26. Small Purchase Ledger (2)
29. Simultaneous communication (11)
31. Single user number (3)
32. First rate (with visor for overlooking) (5)
33. Was this what motivated The Platters? (4,5)
34. Worried sound when the plugs reversed (4)
35. Amend (6)
38. Extra Terminal? (2)
39. Deal with this as a single thing (4)
40. Salesman does this to reluctant prospects—and to his trousers (7)
41. Proverbial rubbish initially (4)
42. One thousand millionth prefix (4)
44. AC's other half (2)
45. Clock watcher for eggs and processors (5)
48. Output method found in this pool (5)
51. Tape container sounds authentic (4)
52. It's a bore when this is happening to your system (8)
57. O U put differently to get out (6)
58. A terminal condition if nothing's said (4)
59. Not Cubic Capacity but a national computing body (3)
61. Stick this in your cash dispenser (3)
63. What the Dead Sea and terminals have in common (6)
64. A bit that's not binary (4)
65. Sounds like a competitor's reached journey's end (7)
66. Where garbage goes after it's been in (3)
67. This CAD should be stretched and made useful (19)
68. That's all folks! (3)

DOWN

1. What you'll get from Systime (9)
2. Not a levy on sin—the structure of a language (6)
3. You can't get output without this (5)
4. You'll need this after using the entrance (4)
5. Working period, the opposite of time up (2,4)
6. Means something's wrong (5,7)
7. Used for digital input (7)
8. Bury and confront across a boundary (9)
9. New Greek word (3)
10. Computers work on this reasonable principle (9)
12. Without this component your system's Certainly Practically Useless (7,10,4)
13. Viper sums it up (5)
20. Give this to the first in line (8)
22. Planned order of events (8)
25. Another one across (7)
27. Nostalgia for what's left of an apple? (10)
28. The name of the game (2)
30. Birds have an instinct for it, programmers do it by design (7)
31. State of direct communication with computer (2,4)
33. What DDT does to de bed? (5)
36. Positive response (3)
37. File of data (5)
43. Court Prude mostly ruined—don't let this happen to your data (9)
46. A little bit of metal oxide silicon
47. The other thing you need for digital input (see 7 down) (8)
49. O gramp produce some software (7)
53. Doing things by eights? (5)
53. Fairly wellabout to make better (7)
54. Fast movement by a program (3)
55. Origin that sounds like something for the gander (6)
56. Fundamental language for computing (5)
60. Punctuation mark in protocol on most machines (5)
62. What computers process (4)

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COMPUTERS IN BUSINESS VIII

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ICL's Perq scientific computer (left) installed in an engineering drawing office. The computer has 1 Mbyte of store, a high quality bit-mapped graphical display, a 24 Mbytes Winchester fixed disc and a 1 Mbyte floppy disc. Right: The computer-aided engineering facility of Marconi Avionics at Rochester, heavily engaged in creating a range of standard central air data computers for the U.S. Air Force and U.S. Navy, under a \$5m development contract won by the company.



The impact of the computer has revolutionised design and manufacture

Keyboard magic in car industry

IN THE auto industry, computers have fast been taking over virtually every aspect of the car, and to a lesser extent commercial vehicles. This ranges from design to—albeit still in the future—the customer's purchase without leaving his arm chair.

The forerunner of this last aspect is about to be demonstrated to 2,500 Prestal users in the Birmingham area, who are to be linked, on a trial basis, directly with Talbot UK's own dealer network's computer system. At a touch of the keyboard they will be able to find out about any new or used car, of any make, in stock at the 100 or so of Talbot's 600-strong network currently linked with the system.

BL Technology, the state-owned car group's research and development arm, says that when such systems are extended to embrace the finance houses and banking systems, the buyer will be able to decide his purchase and pay for it without even visiting a showroom. It is in terms of design

and manufacture of the car that the impact of the computer has been greatest to such an extent that it has drastically changed the picture of the world motor industry even compared with just three years ago. Then, it was thought that the 1990s would see just a few major international manufacturers, each producing at least 2m cars a year to achieve the economies of scale needed to remain competitive.

Some of those economy of scale arguments still apply: components such as engines and gearboxes need to be produced in quantities of 500,000 a year at least to be really cost-effective.

There is no reason why manufacturers should not share them—they are increasingly doing so.

Components sharing, when added to the computer-controlled, flexible manufacturing facilities which have spread in the past couple of years from Japan to Europe and the U.S. means the prospects for the more vulnerable car makers

producing 500,000 cars a year or less, such as BL, are being transformed.

The advent of flexible systems is bringing about the demise of the old, and expensive, processes of laying down new assembly lines for the introduction of individual new models.

The smaller manufacturer can adjust almost instantly to changes in market demand.

To illustrate: the Austin Rover lines at Cowley where the Maestro models are being built can handle up to five differing cars simultaneously; and they will need to do so as different variants of the LC 10 range—on which BL's future depends—are introduced over the next three years. Similar abilities are contained within Ford's new assembly facilities at Dagenham where the Sierra is being produced.

At Cowley, when the facilities are being fully utilised, computers will shift widely varying

hatches of components for different models around the plant, ensuring that precisely the right components arrive at the right assembly stage at the right time; computer-controlled multi-welders and other robots will "recognise" the particular model of car to be built next, and automatically reprogramme themselves to handle the constituent panels and weld them in the right places.

To draw on an example which has been functioning for several years, Toyota Kogyo's plant at Hiroshima happily builds front-engined, rear-drive sports cars, large saloons, small front-wheel drive hatchbacks and estate cars in quick succession on the same line and rarely, if ever, tries to stick a large saloon's engine in the sports car's boot.

So, with the same total capacity, the smaller manufacturer can ring wide changes on models and adjust almost instantly to changes in market demand and his traditional cost disadvantages vis-à-vis the General Motors and Fords are cut by a large margin.

That is the fundamental reason why the consensus is growing that the industry of the 1990s will consist of not just the industry giants, but most of the existing companies linked by a spider's web of collaborative agreements on components, while still retaining extensive individual model ranges.

The computer's uses extend well beyond this.

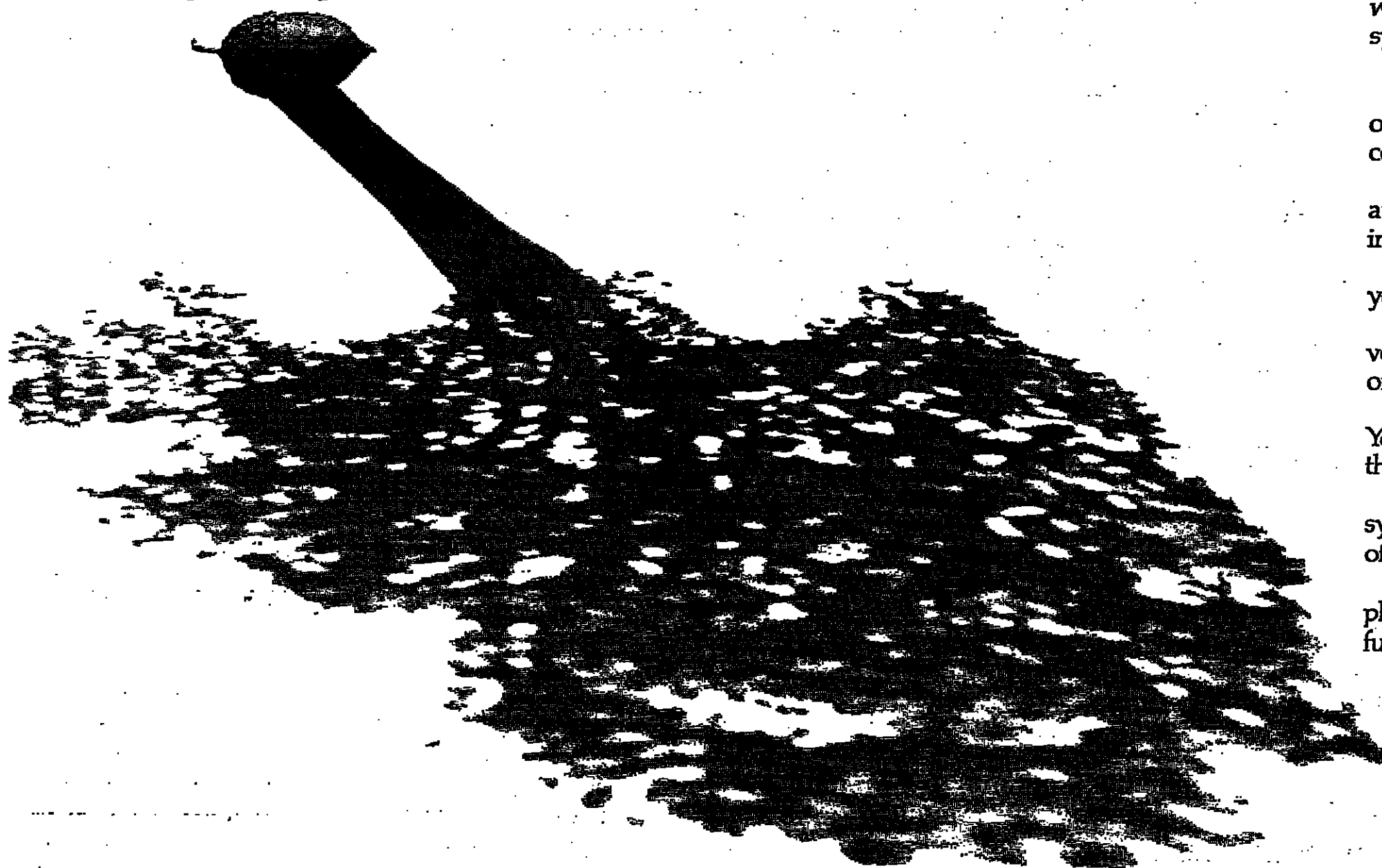
Using the Maestro example again: Austin Rover claims that the car was the subject of the most extensive implementation of computer-aided design and manufacturing techniques (CAD/CAM) yet seen in the UK motor industry and on a scale to match Europe's industry leaders.

The process began with numerical master geometry techniques to delineate the body surfaces according to the design team's outline ideas.

This mathematical definition was then stored in Austin Rover's IBM mainframe computers as a master database for

CONTINUED ON NEXT PAGE

Have you started an
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COMPUTERS IN BUSINESS IX

How the chemical industry uses computing power. Report by William Dawkins

Development in three phases

AT A time when Britain's depressed chemicals industry is struggling in the face of weak prices and declining demand to rid itself of overcapacity, chemical companies are able to use computing power to increase efficiency and cut costs is clearly crucial.

However, computers' traditional function of saving time and manpower has changed radically to a more qualitative role. Few managers are able to put a figure to the contributions their computer systems are making because these contributions do not replace human effort—instead they do jobs which people never had the capacity to attempt.

As one computer manager put it: "We have passed the stage when computers merely helped to cut costs. The benefits are now intangible. We are talking about information rather than savings on clerks."

The vision of a centrally controlled plant with raw materials being fed in at one end and leaving the other without human intervention is still far off, although the chemicals industry has perhaps got nearer to it than most.

Computer applications in the industry have developed in three distinct phases, the main thrust of which is an increasing decentralisation of computing power to both the production and top management levels.

● **Batch processing** by mainframe computers emerged in the mid 1960s mainly as a way to analyse costs and plan production. Under this system information had to be physically taken to a single central computer and processed in lots before being returned—a time consuming and inflexible process.

● A decade later, the falling costs of computing encouraged the arrival of distributed data processing, which removed the restriction of being tied to a single central machine. This opened a whole new range of possibilities, including easier use of computers for process control and monitoring, product planning and design from remote terminals.

The most recent stage involves the development of computer network systems so that any workstation on the network like the Apple II on the desk of the chairman of BP Chemicals, in itself as powerful

as an IBM mainframe 20 years ago—can gain access to information ranging from company accounts to the performance of a plant hundreds of miles away.

Norsk Hydro Fertiliser is an example of a company keenly aware of the advantages of computer decentralisation. In the past 18 months, the company has switched from dependence on a single KIL 1502T to an IBM 4331/4304, linked to three Hewlett Packard 3000 processors, with five terminals spread at plants from Liff to Ipswich.

"The deliberate move from an central machine enabled us to put computer power where the action is," says Mr Peter Skinner, the company's computer manager. "We actually had people over 60 years old finding themselves using terminals and able to do it."

Norsk Hydro Fertiliser: 'computing power where the action is.'

The greatest penetration has been at an operational level, mainly in accounts and ordering, although decentralisation has made the process of linear programming more flexible.

This is a comparatively well-established technique, used on the old mainframe, by which a number of production options such as site, distribution costs and the constituents of a chemical product, can be expressed mathematically on a computer, which will juggle the variables until it comes up with the best solution.

The next step, says Mr Skinner, is to introduce greater direct, direct management participation in the system. The demand for this is strong. "There has been a change from the 1970s when I was very much in a selling situation to one where my main concern is how quickly I can get the service running."

BP Chemicals, which invests \$5m a year on computers, is already well advanced in its drive to bring computers to managers' desks. All seven of its directors and 120 of its executives use desk-top machines. Mr Chris Steward, head of management services, encouraged this trend when he set up a microcomputer support group 18 months ago, which made it clear that the machines

were available to all, along with maintenance and training.

At an operational level, BP Chemicals' computer applications fall into the following main areas, in line with the rest of the industry:

● **Process modelling**, in which a programme, usually run on a microcomputer like an Apple or a Rair, will create a representation of a chemical reaction, giving valuable clues as to how costs can be saved. The microcomputers used here do essentially the same task as BP Chemicals' mainframe performed 20 years ago, only at a tenth of the cost and more flexibly.

● **Production planning**—by using linear programmes similar to those employed by Norsk Hydro, this application simply helps to determine the best use of resources in chemical production.

● **Maintenance**—here "closed loop" programmes are used to double-check the performance of instruments on site and predict breakdowns within an accuracy of one in 10,000. The company has also devised a more complex programme, known as Epac, which can check and predict the maintenance needs of a whole plant. This allows repairs to be made as and when needed, in contrast to the former practice of dismantling and checking a complete factory every year or so to check where repairs are needed by eye.

"It allows us to run rather than costs," says Mr Steward. "It allows us to run predictive rather than preventative maintenance."

In general, BP Chemicals' production oriented computers are performing the same functions as they were 10 years ago, only far more efficiently. The next advance at the production level, says Mr Steward, must be in the equipment the computers help to control.

In this respect, computer aided design, such as that used by British's largest chemical group, has a key role to play. The arrival of three-dimensional graphic design systems, such as that made by Prime computers, has given

prototype programme, known as Isocad, the scope of which is indicated by the fact that it contains 100,000 lines of instruction, compared with the 300 to 1,000 lines in an average microcomputer programme.

"The point about engineering computing is that most engineers think in drawing," says Mr Derek Crooke, manager of ICI's design systems group, in explaining the impact of graphical systems. Isocad has had less complex forerunners in ICI, used to design heat exchangers and chemical vessels.

BP Chemicals: seven directors and 120 executives use desk top machines.

Shell Chemicals has introduced process control and monitoring to 12 of its 19 production complexes and is now investing progressively in plant information systems. The company has invested \$2.7m in computer hardware over the past four years and the UK group as a whole has seen its professional computer staff grow from about 100 to more than 1,000 over the past decade.

The principal thrust of Shell Chemicals' computer development strategy is to provide on-line access to continuously updated information on stocks, orders, customers and products.

The system used for this, called Logistics, has been under development since 1977 and will be in full use this year. The software—usually the most expensive part of any computer system—took 70-man years, representing a cost of about \$1.5m to write. Mr Steward, Arora, manager of information and computing services, says: "The objective is to improve efficiency of operations and ultimately provide a better service to customers."

Before Logistics was developed, Shell Chemical's management was dependent on comparatively inflexible batch processing. With the installation of two IBM 4341s, the company aims to have 200 terminals installed countrywide by the middle of this year. Already, says Mr Arora, the savings from Logistics have been "immeasurable."

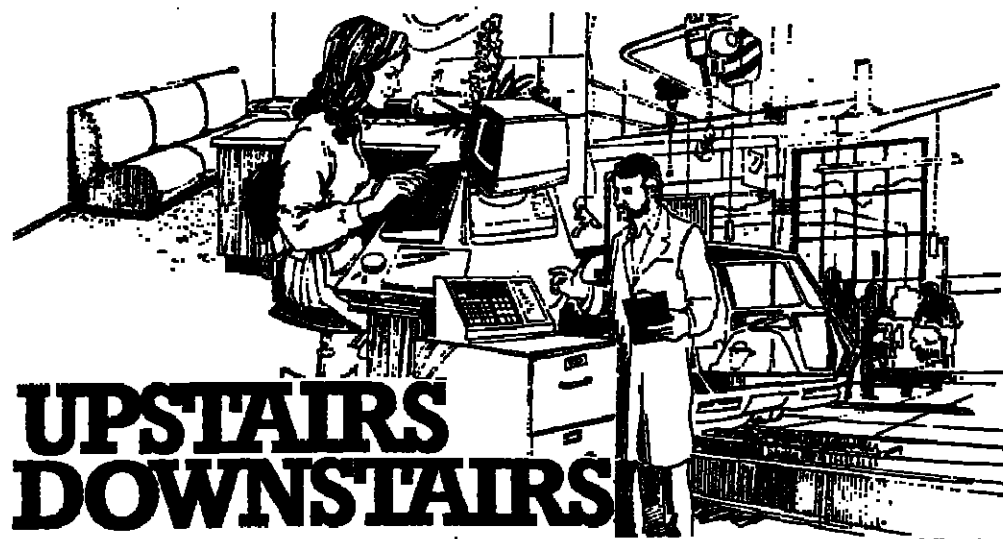
A smaller company, Adrox of Bourne End, Buckinghamshire, a subsidiary of Brest Chemicals, provides an example of a less usual application of computers, which unite electronics with chemicals to provide an automated package.

The company supplies a fluorescent penetrant used to identify faults in turbine blades. Traditionally, the penetrant is sprayed on to the blade and wiped off before the surface is examined under ultra violet light. Human inspectors have to spot the fluorescence left behind in any cracks.

But Adrox is developing a microcomputer programme which automates the process with the help of a robot. In its completed form, it should do the job twice as fast as humans and unlike humans it will of course never get tired or miss a potentially expensive fault in a 6000 turbine blade. The machine includes an automated laser scanner, which is tuned to respond to fluorescence using software controlled by a 2.80 microprocessor.

The equipment will cost up to \$160,000 and is undergoing trials with Rolls Royce and Arco-Lycoming of the U.S. Rolls has already offered Adrox a contract to make a similar machine to spot faults in turbine discs.

"We try to take the total systems approach," says Mr Gordon Stewart, Adrox's deputy engineering director. "We like to say to customers we can supply the chemistry to it, but we can also supply the equipment."



Whilst many companies may consider automating their offices, they seem happy to let the factory follow its old traditional methods. Upstairs—word processing, automated accounting, and computerised ledgers; downstairs—job sheets, movement dockets and stores notes.

With CMC factory data collection terminals there is now no reason why all shop-floor data should not be entered by the operatives themselves directly onto the company system. Immediate once-only direct entry of data brings many advantages. Now, every company department can work from a common database, all at the same level of update. Everything from goods in, to invoices out—taking in inventories, time and attendance, added value, works costs, ledgers, credit control, and every other aspect of management information on the way.

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THE SPACE PROBLEM

With your computer installed, how are you going to arrange your

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THE ERGONOMIC PROBLEM

Lighting, ventilation, operator comfort—all these are vital factors in the computerised office.

Normal fluorescent lighting, for example, causes glare from VDUs, inducing eye-strain, headaches, and fatigue in anyone using them.

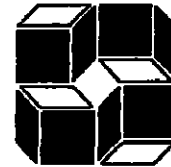
Datastation's special up-lighters bounce diffused and even light off the ceiling, eliminating glare and costing less to run than normal lighting.

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FT/11/4

Car industry magic

CONTINUED FROM PREVIOUS PAGE

the complete body design. Further, the computer can assess the strength and safety of the overall design, and the functioning of its main components.

The finite element analysis techniques used in the later stages are well established. Austin Rover has been using them since 1971—but, says Austin Rover, the Maestro was the first model to be manufactured exactly to the definition of the master database in all respects.

All the above means that another traditional, and expensive, process is disappearing—the building of a long succession of test prototypes. The same master database was used in the design and manufacture of press tools and jigs for many of the car's 300 body panels.

Some 1,000 press tools were needed altogether, and many of them were evolved by tool designers based at 20 terminal linked, inter-actively with the mainframe IBM computers, using light pens to build up the tools design from master database material.

Increasingly, this type of computer deployment is not only cutting costs but new model lead times. It is also allowing changes to be made to evolving models much more speedily and cheaply.

It can be expected, moreover, that the flexibility provided by the computer will come into play even more as the industry moves in the late 1980s towards

another revolutionary phase—the manufacture of cars not with pressed sheet metal bodies but using skeleton aluminium frames clad with plastic panels.

The advent of this type of car in volume production is expected to give manufacturers a new freedom, not only to update models much more frequently than currently but to allow a large number of variants to be made easily and cheaply, as the expensive tooling for sheet metal work will not be required. In those circumstances the computer's role will be even more vital both in the design process and in the

Toyota of Japan has announced an electronic modulated suspension system.

expected greater complexity of materials handling.

The computer is also fast taking over the car itself. The introduction of voice computers on Renault's new 11 model and the Maestro is just perhaps the rather gimmicky tip of the iceberg.

Motor industry technologists regard as just a few years away the achievement of a vehicle in which the driver's controls consist basically of a steering wheel and blank TV screen. The only information shown on the screen would be that immediately needed—speed, for example—or that summoned up by the driver

(voice) request, or the flashing of emergency signals (accompanied by voice and light). Ergonomically, and in every other way, such systems would allow the driver to move his vehicle from A to B in the most efficient way. But the manufacturers might have some psychological hurdles to overcome in trying to woo drivers away from the penchant of many for "Starship Enterprise" type dashboards exemplified by the current BMW 735i.

But out of the driver's sight, the computer is already well on the way to controlling the car's working systems. Computer-controlled engine management systems are well established; anti-lock braking systems, with each wheel prevented from locking by microcomputers—allowing a driver to "steer" brake and steer at the same time—have started their progression down from the luxury car sector.

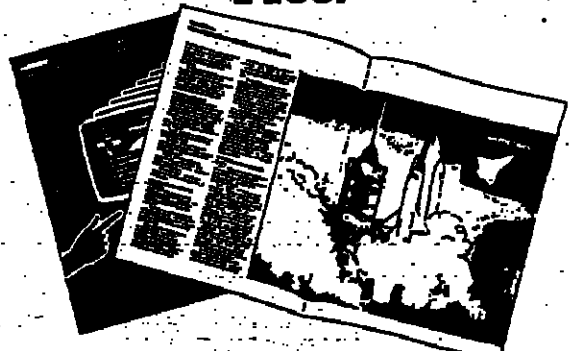
In the past month Toyota of Japan has announced an electronic modulated suspension system. It uses a microcomputer to adjust the damping forces of the shock absorbers at each wheel. So not only can the driver select hard or soft ride, depending on whether he is driving fast and needs good handling or whether he is cruising along poor roads; the system also increases the damping resistance on one side automatically during cornering, thus greatly reducing body roll. It also automatically stops the front of the car dipping or the back squatting on hard braking or acceleration.

It is also probably no more than three to four years from now that the gearbox—automatic or manual—will start to become a thing of the past, replaced by computer-controlled constantly variable transmissions.

In other fields computerised Viewdata systems are emerging to challenge other motor industry traditions. The monthly publication Glass's Guide, regarded as the motor trade's "Bible" on trading prices now has a rival in Val Valcar launched at the start of this year by Viewdata Recall Systems and Data Recall.

It provides stock market type daily listings of used car prices achieved all over the country. To it is being added a host of other systems: financing packages, vehicle transport information and others yet to come. Its managing director, former Talbot executive Mr Mike Orry, points out that his main difficulty is in identifying all the systems' possibilities rather than whether it has limitations.

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FT

COMPUTERS IN BUSINESS X

Greater emphasis on integrated systems

New manufacturing applications

THE LONGEST established use of computers in the manufacturing environment is in production control in which customer order input, materials/component purchasing, stock control, shop order release, bill of materials and similar functions can be speeded up and generally made more efficient.

Nowadays these areas are the subject of a good deal of integration using a common database — an electronic collection of continuously updated facts to which all the participants have immediate access.

A typical example is IBM's Communications Oriented Production and Information Control System (COPICS), which the company describes as "one set of books organised as a company database." The people responsible for recognising and recording events use keyboard/screen terminals to enter their data instead of pen and paper. The information is then readily accessible to other users, who look at only the latest version of any particular fact.

Chemical manufacturer Diversey uses an IBM 4331 computer with COPICS and has achieved improved stock control, a tracking system for raw materials and finished goods, and better methods of forecasting.

R. A. Lister, which makes about one diesel engine a minute and grapples with 40,000 part numbers, also uses COPICS on an IBM 4341. An important outcome has been shorter lead times, positioning the company more favourably in a highly competitive market.

A similar system from NCR called Interactive Manufacturing Control System (IMCS), was recently the subject of a £180,000 order by Bonar Long, the Dundee manufacturer of electricity grid system transformers. Using display terminals linked to an NCR I-9040 computer, purchasing, sales and production control staff will have instant access to stock and production information. A similar NCR system called Mission is going into Martonair, the West London pneumatics company.

Earlier this year, Burroughs revealed the first installation of

its TMS system, which it claims "embraces all the elements of financial and production control on a single database." It is installed at the Tynemouth plant of Stewart-Warner, the U.S.-based pneumatic tool and pump manufacturer.

Running on a Burroughs B-1900 machine, TMS saved the company \$500,000 in the first year of operation — at a time when the recession, particularly in the building and civil engineering industry, had reduced output to a fraction of available capacity.

Burrough's new 'Total Manufacturing System' claims to embrace all the elements of financial and production control on a single database.

It was interesting that John Holmes, Stewart-Warner's manufacturing director, steered clear of attempting to revive the entire plant with any of the latest elixirs such as robotics and flexible manufacturing systems (FMS).

"The company was much more concerned with keeping the existing machine tools fully occupied by ensuring that information flowed as smoothly and as quickly as possible."

Most of the larger computer companies and some of the smaller ones offer systems of this kind, with various degrees of integration. ICL, for example, has an on-line real time system called OMAC 29 that runs on the 2900 and ME29 machines.

Typical users are Albright & Wilson and Bostik, but there are 200 OMAC 29 systems in use world wide. ICL also has 500 installations in smaller companies of a system called SAVES 25. It has also made a speciality of data collection terminals (the 9600 series) of which nearly 3,000 have now been shipped. The company claims some 8 per cent of the Western European market for such terminals.

While these basic, financially oriented computer applications have been emerging over three

decades, other, parallel application paths have been developing on or near the shop floor under the general heading of "automation."

The oldest is probably the machine tool application. This started with paper tape prepared off line and played rather like a gramophone record to guide the tool's cutting heads. It was followed by CNC (computer numerically controlled) systems so that today a part can be prepared using a small screen and keyboard mounted on or near the machine.

The data is held in a semi-conductor store and the operation managed by a micro or minicomputer.

The other major application areas are at the two ends of the production process—designing and draughting on the one hand and testing at the other.

Computer aided design (CAD) started with relatively simple screen and keyboard systems which were a more productive alternative to paper and pencil. Drawings can be compiled with great convenience on the screen, with easy manipulation and modification and the final result produced from the electronically stored data on a high speed large-paper plotter.

But just as industry—particularly in Europe—was coming to terms with CAD, other ideas bearing yet more acronyms began to emerge.

In CAE (computer aided engineering) for example, enhanced CAD techniques allow three dimensional colour representations of components and their assemblies to be viewed on the screen. These 3D machine pictures can often also be animated to check, for example, clearances of moving parts. Such problems come to light at a glance, not after 30 minutes spent gazing at drawings.

Other CAE programs on offer allow system dynamics to be analysed, fatigue life to be estimated, stress distribution to be seen in colours—the list is considerable.

A further development is CAM, computer aided manufacturing, in which the CAD technique is extended to



A typical Hewlett Packard data collection terminal in which information is being extracted from a document using a bar code reading "wand" on the production line. This kind of equipment, together with process control systems have recently been supplied to Redfearn at York and Barnsley where bottles and jars are made, and to Sabena, the Belgian national airline.

provide on screen or printer listings and grouping of parts, materials requirements, tooling and test at all levels of technology, administration, organisation and personnel would be covered. As A. D. Little executive Irvin Krause puts it: "There is hardly any aspect of operations that CIM leaves unaffected."

There are immense difficulties, however, to be overcome before this kind of thing can happen. They embrace management comprehension, planning and implementation and include, of course, trade union acceptance.

Such a factory might incorporate CAD, CAM, CAE, FMS, CNC robots (now about to grow electronic eyes), machine maintenance, materials handling—quite apart from the basic production control and planning computers exercising financial control.

CIM implies the ultimate integration of all those databases into a unified whole so that no matter what aspect of the total production operation is involved, immediate updated information is available to everyone.

That is what organisations like A. D. Little and GE in the U.S. are now turning their attention to. But there is a long way to go yet.

Geoffrey Charlish

Increase in computerised freight scheduling

How computers help to cut distribution costs

THE TRANSPORT and distribution of freight is one of the most costly and potentially inefficient operations that management has to tackle. It is also one of the most complex if done efficiently and it is this complexity, with the high number of variables, that makes distribution a suitable candidate for computer technology.

Almost £20bn was spent by British companies and the national rail and inland waterway networks on freight transport and distribution in 1981, the latest available government figures show.

This substantial cost is generally regarded as an overhead by manufacturing companies and its reduction, like all overheads, is a prime target for management action.

Computers can help in a variety of ways, but the objective is to get the goods from factory to consumer at the least possible cost. This is the ultimate aim of the various computer programmes and packages available to provide "vehicle route scheduling."

The problem these programmes are designed to tackle is far more complex, however, when it is examined in detail than at first appears. In the simplest case, where one factory is providing goods for one shop, the task of finding the cheapest route for the vehicle or train is not complicated by a host of other variables that cloud the issue in the greater complexity of the real world.

In this straightforward case, the vehicle operator would generally choose the shortest distance between the two points. This could be done without computers.

But as the distribution problem becomes more complex with a variety of sources for the goods or materials and a range of destinations, computer techniques start to come into their own.

This is because computers are able, through these huge memories, to cope with the large number of variables involved in a more complex distribution operation. This is not to say that computers and the programmes that have been written for vehicle route scheduling have perfected the ideal freight distribution

system; far from it. The problem is still immensely complex, even for advanced computers.

There is no perfect solution awaiting the freight distribution manager who wants to deliver goods to 20 or 30 towns from a range of depots dotted around the country using the shortest possible distance to visit each town at least once.

Nor are there perfect solutions to the associated problems of taking account of vehicle maintenance costs incurred in operating a route network that may vary in the demands it makes on the vehicle. There are other variables too, which the distribution manager can ill-afford to ignore if he wants the most efficient and cost effective distribution system.

Computers, with their huge memories, can cope with the large number of variables in distribution operations.

In particular, the distribution manager needs to take account of vehicle performance, fuel consumption, components on the vehicle which are susceptible to failure under particular operating circumstances and analysis of information made available from the on-board tachograph vehicle and driver performance meters called for by law for most commercial vehicles.

A further variable is overlaid this already complex system of network distribution operations by the need for the company to ensure that the drivers conform to the statutory drivers' hours regulations introduced under European Economic Community regulations. Under these rules, drivers are allowed only to drive for a fixed length of time in a day, in a week and for a limited time during the night.

The distribution manager also had to take into account the needs of the customer. The customer is likely to have a variable demand for goods or materials; this will need to be reflected in the choice of an

appropriate size of vehicle for the task in hand. Also the customer may have his own constraints in terms of demand for his products or available storage space.

Information on all these variables, where it is readily available, will help the freight distribution manager to define his minimum size of vehicle fleet.

Despite the complexity of the problems involved, and the difficulty of solving them perfectly, a number of algorithms, or different mathematical procedures have been devised to help improve the efficiency of freight distribution.

One of the most useful layman's guides to the subject "An introduction to computerised vehicle scheduling" is published by the research branch of the Institute of Grocery Distribution, at Watford.

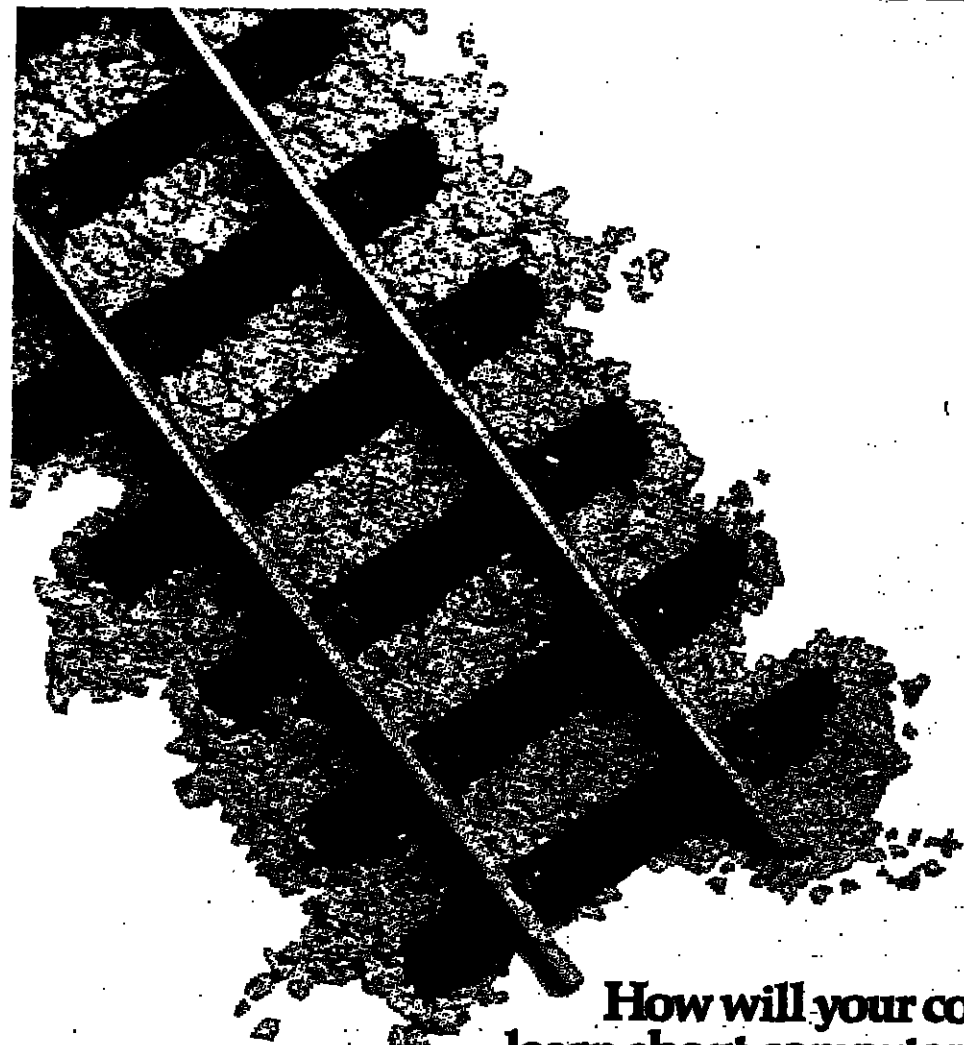
The guide was written primarily for large wholesale and retail distributors who are benefit from more efficient scheduling of deliveries to small shops and stores. But as Mr Andy Robson, the author of the report says, it "would be of interest to anyone involved in transportation and distribution."

The report points out that as well as financial models for day to day operations, such as total distribution cost simulation, or customer service monitoring models, like demand forecasting or inventory control, more sophisticated models are used for tactical and strategic decision-making.

The problems of depot location, vehicle scheduling and fleet maintenance are now quite extensively modelled, according to the report, and there is an ever-increasing use of these analytic models in the day-to-day management of physical distribution.

In a survey of data processing in the grocery trade, one of the more recent surveys of freight transport and distribution, the Institute of Grocery Distribution showed that, five years ago, 98 per cent of respondents to the survey used computers in warehouse stock control, while only 50 per cent used computers for vehicle scheduling and 20 per cent used computers for the siting of depots.

Lynton McLain



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COMPUTERS IN BUSINESS XI

Geoffrey Charlish highlights the electronic revolution in retailing

All change at the checkouts

IT WAS recently predicted by a point-of-sale research organisation called Post News that from next year, until at least 1987, some 80,000 electronic terminals will be installed annually in Britain's supermarkets alone, another 20,000 going into smaller outlets.

Even at an average price of say, £1,000, this represents £100m of business annually for equipment makers — quite apart from units that will be installed by other small traders, the department store, restaurant, sitting station, newsagent, travel ticketing and other specialist markets. In all, there are about 100,000 retail outlets in the UK alone.

Another prediction, by market researchers Larose, Sweeney, is that the European market for electronic cash registers and point of sale terminals will rise to £270m in 1986, growing at 10.6 per cent a year. The UK alone will account for £105m, says the company.

So it is little wonder that there are some 38 companies in competition. They are offering units that range from simple "stand-alone" electronic cash registers (ECR) through to local or remote terminal systems with extensive data capture and memory facilities, often able to support a laser scanner for reading product bar codes.

ECR terminals first began to appear in the late 1960s, in the days of the big computer in a central location. So early systems used simple keyboard terminals unable to remember anything or manipulate much data, linked to local or remote mainframe computers. It was neither very efficient nor cost-effective.

But cheap logic and memory "chips" began to make themselves felt in the 1970s and the microprocessor made its debut in 1972. It became possible to house intelligence and memory

in stand-alone terminals which referred to distant mainframes only for management/corporate purposes.

Another research firm in this area, Retail Management Development Programme (RMDF), believes that POS terminal prices are now, in real terms, about a third those of the early 1970s. Inevitably, more and more of these devices will be seen on shop counters.

Point-of-sale systems have various financial benefits. For example, by discovering sales trends quickly, operators can

the intelligence and memory. At day's end the master can empty itself down a phone line to a remote computer for corporate data mustering.

At this point the top end of the ECR market has met and overlapped the bottom end of the original point of sale market.

Towards the £5,000 per terminal top end of POS, however, are the so-called "clustered" systems with large numbers of terminals in supermarkets (where one in five checkouts will probably be using laser scanners by 1987) and department stores. The terminals work to an in-house computer capable of storing and manipulating very large amounts of diverse data.

Such systems are fully programmable, have management terminals, fast report printers, rigid disc stores and probably on-line communications to warehouses, other stores and headquarters.

Technically, this kind of system is at the sharp end of things and will soon form the interface between point-of-sale and bank. Some terminals already have magnetic stripe readers for the new cards that will be used in the coming age of EFT, or electronic funds transfer.

The idea is simple enough. The customer's card is inserted in the terminal and the keys in her PIN (personal identification number) on a hooded customer keypad. Then, the shop assistant keys in the amount of the sale, the computer checks the PIN and whether the customer has adequate funds in her bank account, her bank account is debited and the shop's account credited. It would all be done over phone lines.

A variant proposed by Philips and on trial in France is the "smart" card which cuts line connection costs by



An electronic point of sale terminal from NCR in use at a branch of Army and Navy Stores

recording all the transactions on a solid state plug-in module which is either taken to the bank or rapidly transmitted by phone line at night.

The customer has a card with a chip embedded in it which is decremented by sales and incremented by salary or other inputs to the owner's account. It becomes a form of money.

Although this seems very tidy and convenient, the idea is not without its snags. One of which is that such cards act instantly. Gone is the three-day delay of cheque clearance and there are no weeks of grace as with a credit card.

So there may well have to be a credit element, payment being delayed if the customer indicates, possibly with associated interest charges. Existing credit cards will presumably have to be accommodated.

For the retailer it appears to mean more electronics: he will need a new EFT terminal to work alongside his existing point of sale equipment, although new equipment introductions will no doubt embrace the whole POS/EFT operation.

According to Eric Foster of Spectra Services, a retailing consultant, 65 per cent of UK transactions are still cash, 30 per cent cheque and 5 per cent credit card.

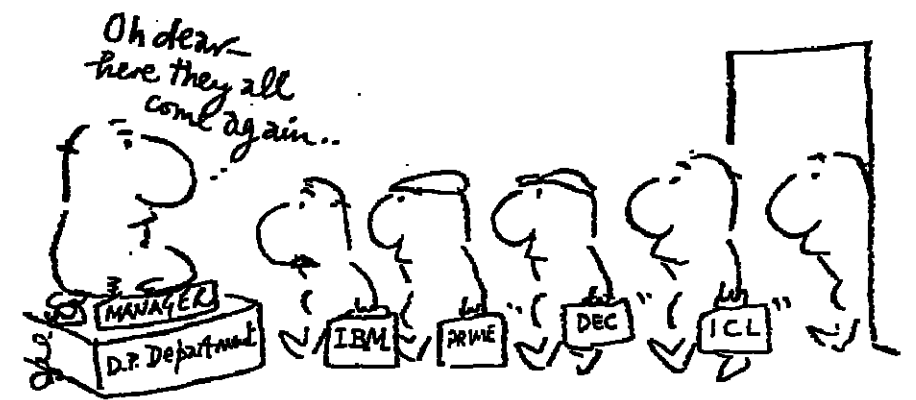
Even at this cash level, Foster believes that if all the cheques and credit cards were replaced by EFT cards, the retailer could expect a 50 per cent saving in payment time and almost 20 per cent in costs.

For the banking community, it all spells out change, uncertainty and expense—the affected parties have to agree and someone has to pay for the terminals.

There was a proposal to run a pilot scheme in Southampton early this year, but it was dropped, largely because although the retailers could see advantages, they were not willing to help with the costs of the trial.

However, the Committee of London Clearing Banks (CLCB) is still taking advice and is expected to report soon.

Useful phone numbers: Post News, 0935 83245; Larsen Sweeney, 0623 67000; RMDF, 0273 72287; Spectra Services, 0734 34555.



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Aids for more efficient stock control

Wide benefits for the wholesale sector

THE UK wholesale trade is a natural market for computerised methods since wholesale and cash-and-carry companies operate competitively on high turnover and low margins. Moreover, it is also a sector where wholesalers are under long-term pressures—from the growth of major multiples on the one hand, and the profitability problems faced by food manufacturers themselves.

As the multiple chains continue to increase their share of the market—at the expense of the small retailer—the wholesalers will face a shrinking market for their services, since most of the big retailers deal directly with the manufacturers themselves.

Small, independent retailers—the sector traditionally supplied by wholesalers—are going out of business at a faster rate than new ones are starting up. The grocery wholesale cash-and-carry sector provides for about 76,000 small grocers and accounts for one-third of all grocery sales. A decade ago there were over 1,200 wholesalers in the UK, but now buying power is held by a few major groups, such as Linford, Booker-Belmont, Nurdin & Peacock, and Makro.

There are about 350 operating companies in the whole food and non-food wholesaling business.

Many of the major wholesalers not only supply small retailers direct but also operate cash-and-carry warehouses so retailers can "cash-and-buy" their supplies.

One of the aims of the electronic data storage systems now being used is to provide a sales receipt for VAT purposes at the cash point—a receipt that also contains a brief description of the product—without in any way slowing the throughput.

Given the pressures on wholesalers—with tight margins and high volume of turnover—it is not surprising that the industry is already making use of electronic data storage systems.

of retailers anxious to get back to their shops.

The second main aim is to ensure tighter stock control so that at no time does the warehouse run out of adequate supplies.

The first criterion for electronic data systems in cash-and-carry or wholesale warehouses

is that they are linked throughout the operation—from goods received right through to despatch or the trade buyer at the cash desk. Many wholesale operations ignore this to their cost.

At the "back door" there should be an on-line terminal to enter the individual product code, the quantity, and cost. This has the advantage of linking labels printed by an in-house computer so the right number of labels can be produced showing the VAT number, the product code, the selling price, and product description in order to avoid label-switching (a common cause of theft).

At point of sale, the electronic checkout will have the product code keyed in by hand which will automatically retrieve the price. This, together with VAT information and a product description, is then printed on the customer invoice.

The stock sold is also automatically checked off by the in-house computer which, according to the information fed into it, can make up an order by product and supplier for re-ordering.

Moving stock within the wholesaler's warehouse can also be helped by computer control. The computer can help determine where the goods should be stored to facilitate their extraction in the most effective way.

Moreover, as electronic data systems spread throughout retailing, so the wholesalers' computers may receive orders from customers by computer. These will need to be reprocessed by the warehouse computer system into specific orders. This will mean greater attention paid to goods' location, the type of packing used, the destination of the goods, and the delivery schedule acceptable to the retailer.

A new report by the Economist Intelligence Unit on the implications of electronics for retailers suggests that laser-scanning systems "have potential applications at both the front and back door for cash-and-carry wholesalers." It says that if the out-cases containing products also carried a bar-code (a series of lines which represent a number unique to that particular product) then "this would pave the way for speedier processing at the goods receiving area."

However, the report points out that a different type of laser-scanner needs to be developed from the type used in supermarket point of sale systems. "Given the size and weight of the wholesale packs, conventional slot scanners are of limited value because the goods cannot be passed over the scanner," says the report.

Trials have demonstrated that hand-held bar-code reading devices such as "lightpens" are unsuitable in cash-and-carry outlets.

David Churchill

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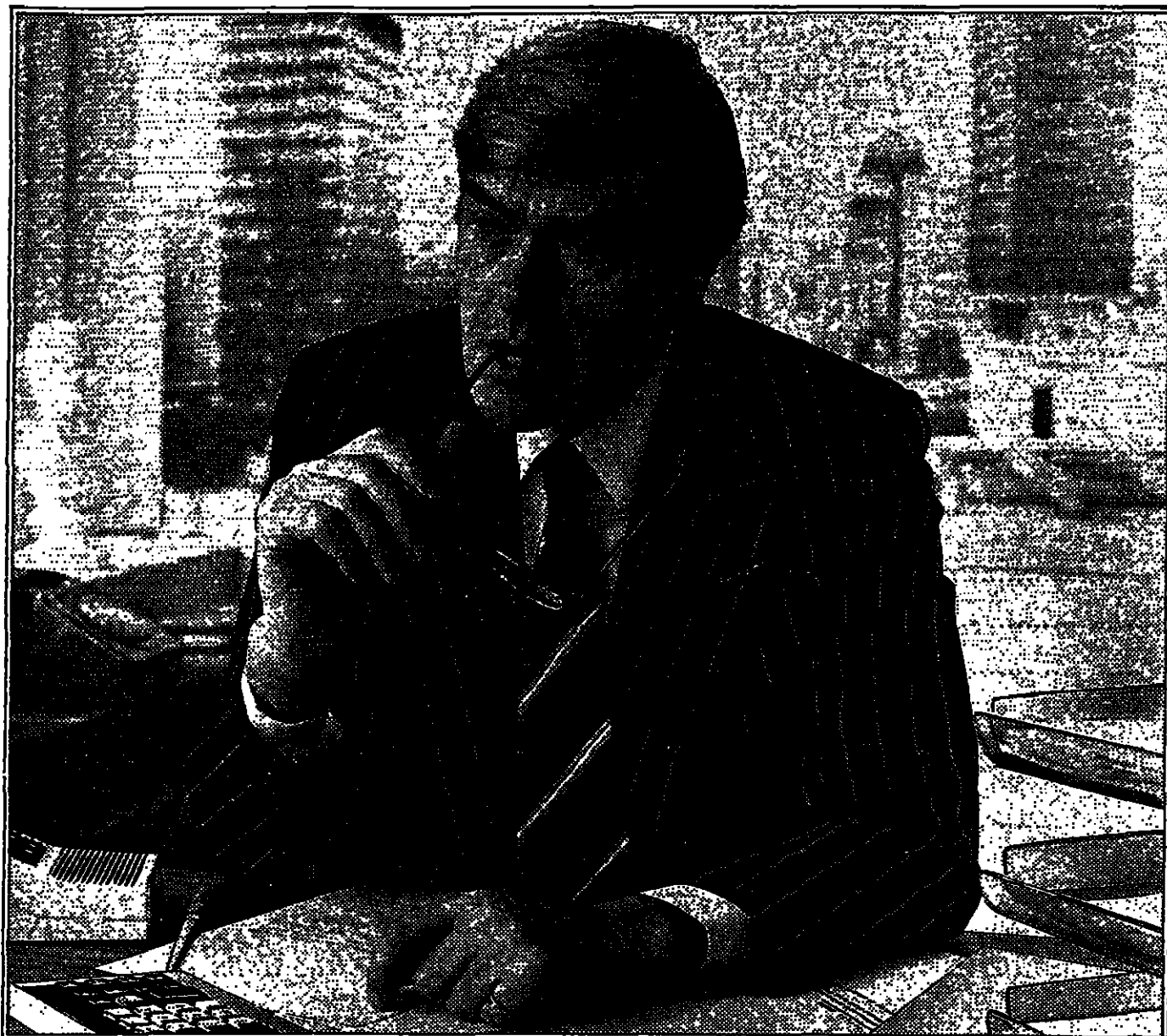
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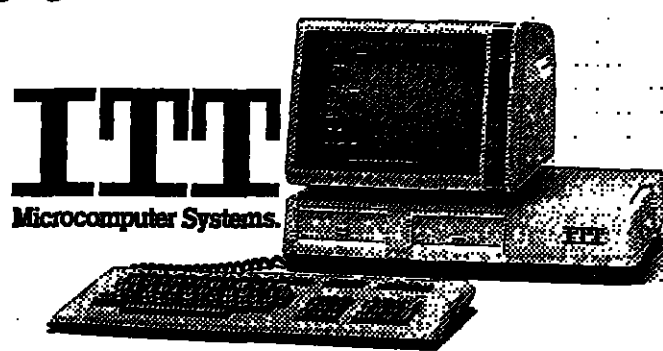
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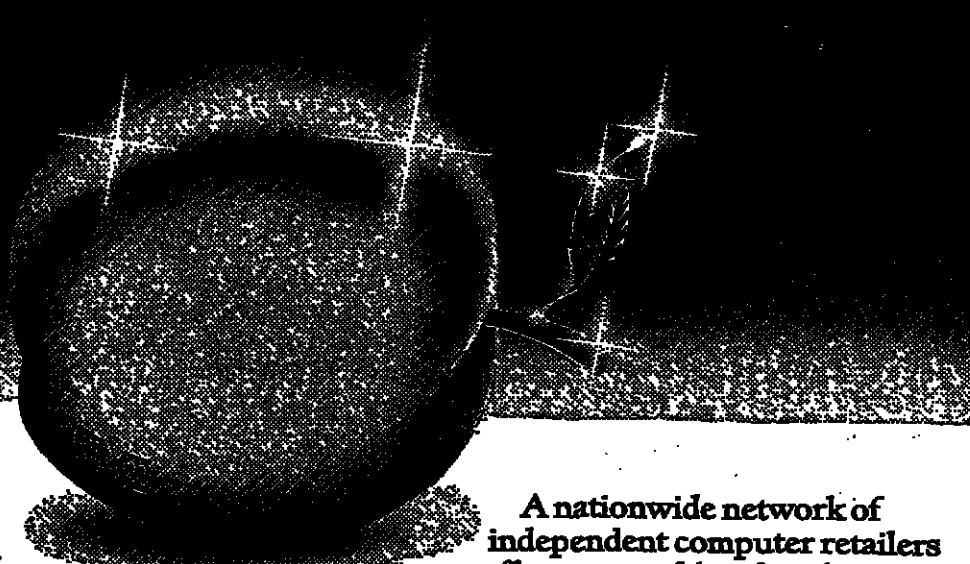
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COMPUTERS IN BUSINESS XIV



The U.S. computer industry is equipping itself for battle and vowing that "Made in Japan" will not become the standard label on computers sold in U.S. Above: silicon chip manufacturing plant at National Semiconductor, Santa Clara, California

On this and the following three pages FT writers discuss developments and attitudes in the leading computer nations

U.S. the world leader—and means to stay there

IF 1983 is the year of the computer, then the U.S. must surely be the nation of the computer.

Americans are in love with computers, and their chief concern regarding computer technology is that the U.S. should stay ahead of the rest of the world in creating ever smarter, ever cheaper, ever more computers.

The computer has become almost as much a fact of everyday life in the U.S. as the automobile. The major growth in computerisation has come through the advent of the low-cost personal computer. With 5m "home" computers expected to be sold this year, the computer is now the largest single consumer electronics product market.

Computers in the home, however, are just one aspect of the explosion in personal computers. According to a recent survey conducted by Future Computing, of Richardson, Texas, 25 per cent of elementary schools and 60 per cent of secondary schools in the U.S. have computers. In some states, such as California, the proportion is much higher. Future Computing predicts that educational software alone will represent a \$1bn business by 1987.

Computer literacy is now widely viewed as an essential part of elementary education in the U.S. and there is increasing pressure on parents to provide their children with the opportunity to use computers. Com-

puter summer camps are sprouting up in the place of sports camps; businesses offering computer lessons for children are flourishing; and the average age of computer users is lowering sharply.

With so many children becoming computer experts it cannot be long, reason the market analysts, before adults feel bound to catch up—the home computer is a reality. In technology-conscious California, "leading consumers" (the group that leads the trends according to the market surveys) are two-computer families in which the children typically will have their own computer.

Most of the social influences of computers are seen in the U.S. as positive, providing new personal and business opportunities. But just as the automobile has created social problems such as air pollution, crime and road deaths, so computer technology brings with it some new hazards.

Computer crime is a relatively new phenomenon that the law has yet to adjust to. Recently in California, a group of computer company executives were charged with stealing secrets from their former employer. For the first time, law enforcement authorities were granted permission by the courts to search for the allegedly stolen property in the memory banks of a computer.

Extending the scope of search warrants to cover computer memory is one small example of the many adjustments to the law that must be made to take account of computer technology. Other thorny issues include the patent and copyright protection of computer software and the circuits that make computers work.

INTERNATIONAL COMPUTER MARKET (U.S.-based manufacturers)				
	Number of systems shipped	Cumulative number in use	\$m value shipped	\$m value in use
1976	35,500	145,950	4,234	33.3
1977	59,600	190,940	7,214	38.8
1978	89,000	275,490	9,112	46.1
1979	151,070	423,560	10,621	54.0
1980	221,980	641,540	11,252	62.0
1981	336,070	954,810	12,296	65.5
1982	497,190	1,430,300	13,778	72.5
1983	707,450	2,118,850	15,714	82.9
1984	976,940	3,073,890	18,244	94.4
1985	1,259,060	4,229,050	20,579	108.2
1986	1,546,900	5,816,750	23,258	123.4

This is the total of all general purpose computers, minicomputers, small business computers, desktop computers, and "other" systems such as IBM's S/7. Minis used in SBCs are subtracted to avoid double counting.

Source: International Data Corporation.

The root problem is that technology changes too fast for the law to keep up. Although there are laws on the statute that provide protection for individuals and businesses from the misuse of computers, such laws are not designed to deal with the reality today of low-cost microcomputers that are easy to use or abuse.

Computers also pose a threat to personal privacy. Computers provide the means for information gathered legitimately to be collated and perhaps put to sinister, or unacceptable, purpose. Any magazine subscriber in the U.S. can be sure to receive a regular pile of "junk mail" because his name and address has been sold as part of a subscription list.

This can be amusing when, as this reporter has, one receives a single day's mail solicitation to subscribe to a new magazine for executive women, a pamphlet on homosexual health care and coupons for disposable diapers. It is at least heartening to know that not all of the information held in computers is collated or correct.

More serious, however, is the threat posed by the storage of personal credit information in computers. Due either to errors or unresolved disputes, individuals can find themselves unfairly unable to obtain credit. It is a fact of life in the U.S. that it is essential to have a credit "record" on one of the several computerised systems that store such data. To remove a "bad" credit rating from a computerised system is a major problem, although the law now provides individuals with the right to know what their records contain.

Reliance upon computers to perform so many essential tasks, be they business or social, raises the issue of what happens when the computer breaks down. In the not too distant future new technology that provides "fault-tolerant" computers will help to solve these problems. In the meantime, computer failures will cause major inconvenience and sometimes danger. The computer industry is one of the major growth areas in the U.S. economy, and as such is providing employment in increasing numbers. It is not, however, making up for the decline in "smoke-stack" industries and probably never will. Most of the labour-intensive processes that go into building computers do not occur in the U.S., but are exported to countries where labour costs are much lower.

Computers also represent automation of both clerical and manufacturing tasks, and there is a very real fear of computerised equipment reducing the number of jobs available in offices and factories. In California, such fears receive little attention because the electronics

within the Administration) are at odds on how these goals can best be achieved. Most industry leaders favour a free market approach. They want to see the government negotiate with Japan to provide access to that market for American-built electronics and computers. There is a growing feeling, however, in favour of protectionist measures to counter the "Japanese threat."

Administration policies have been sympathetic to the industry's problems, but not always constructive. The Justice Department has turned a blind eye to increasing inter-company co-operation in research and development (that could potentially run up against anti-trust laws). Trade negotiators have made some progress in assuring, at least in principle, that U.S. manufacturers have access to the Japanese market.

On the other hand, the Defense Department favours export control policies that would give it control of export licences on hi-tech goods.

While the goal is to prevent U.S. technology getting into the wrong hands, the proposed procedures could cripple U.S. exporters by creating a log-jam of applications for export licences. Then there are seemingly well-meaning but misinformed efforts on behalf of the industry such as the Federal Trade Commission investigation into Japanese memory chips (an essential component of computers). While the FTC looks into alleged price-fixing, the industry is struggling to survive a Japanese price war on this product.

In what may provide the U.S. computer industry with a significant boost, however, the Defense Department has unofficially announced the creation of a U.S. answer to the Japanese "Nth Generation Computer Program." The Japanese program aims to develop a new class of "intelligent" computers with which Japanese manufacturers could take over a large portion of the multi-billion world market for mainframe computers.

The U.S. Defense Department program is titled the "Nth Generation Computer Program" and is directly aimed at countering the Japanese goals.

Louise Kehoe

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COMPUTERS IN BUSINESS XV



The NCR Decision mate V (seen left) is a single station, personal computer system for the business professional. It spans the information processing spectrum from an 8-bit single processor to dual 8/16 bit processor.

Industry standard operating systems provide accessibility to a broad range of languages and supportive software tools.

Pictured on the right are several of the two new DRS 20 video terminals introduced by ICL.

The DRS 20 series of multi-microprocessor based distributed resource systems provide interactive access to ICL mainframe computers.



The spectacular rise in personal computer sales has happened without denting the mainframe market, reports Joan Gray

Micromania sweeps through Britain

MICROMANIA SWEEPED Britain last year and shows no sign of abating.

In a rush unequaled anywhere in the world, more than half a million people in Britain bought a home computer in 1982. Home computers were taken up as the latest money spinner by chain stores such as Boots, W. H. Smith, House of Fraser and John Menzies, and promoted like glossy encyclopaedias as your next vital purchase if you want to secure your future.

Britain now has twice as many home computers per head of population as the U.S. and one and a half times as many as Japan: two-thirds of all the home computers sold in Europe are sold in Britain and, encouragingly, most of them are made in Britain as well.

Figures prepared by microcomputer consultant Robin Bradbeer show 459,000 people in Britain bought a home computer costing less than £200 last year—and three of the four market leaders were British. Sinclair's ZX81 was the clear leader with sales of 220,000; Sinclair's Spectrum sold 75,000, and Dragon Data's Dragon 32 sold 25,000.

The Commodore Vic 20, which at 100,000 had the second largest share of the market, is now to be manufactured in Britain.

Of the 50,000 slightly more expensive home computers sold, costing just over £200, Bradbeer found the clear market leader was another British machine, the BBC Computer, with sales of 40,000.

The home computer boom started three years ago, when Clive Sinclair broke the £100 barrier with his ZX80 computer. In the face of great scepticism from his competitors, Sinclair financed the ZX80 development from his own country, convinced that people wanted to know more about computers but could not afford to own one of their own.

"We live in a computer age, and people need to understand computers," he said. "And the best way to do it is to get your hands on one and learn to programme it in the least frightening environment, your own home."

Sinclair's conviction paid off. He is now the world's biggest computer manufacturer in terms of numbers sold, and personally worth £128m.

The rise of the home computer has also revived the fortunes of the ailing toy manufacturer Mettoy, which launched its Dragon 32 computer last August. The company decided to move into the computer business after observing sales of its Corgi toys suffering because its customers were collecting electronic toys and home computers instead.

So Mettoy decided to move with the times, commissioned Patentrete consultants to design a home computer, and launched it to a runaway success. With demand consistently running at double the 3,000 a week it could produce, Mettoy decided to float Dragon Data as a separate company, explains Richard Marshall of Prutech, which helped back the venture.

"The company decided that if you can't be in home computers in a big way it's better not to be in them at all," he said. "So they put the Dragon in a separate company with Mettoy as a shareholder and the money from the deal helped put new life into the old company, which is now developing a complete new look and advertising for a new chief toy designer."

Such is the spectacular success of the UK as a home computer market, that the U.S. company, Commodore, has just transferred its home computer production from West Germany to a new £20m factory in Corby to put it right in the heart of the largest market. It expects to sell nearly half its output in Britain: 250,000 home computers to the UK this year, 300,000 next.

The spectacular rise of the home computer has happened as sales of the more powerful personal computers for businesses have also boomed. Both have grown as complete new businesses, without denting sales of the traditional workhorse computer, the mainframe.

According to Mr Derek Pedder, managing director of BIS Pedder, who is in the throes of completing his latest census of the computer industry, "the small systems business has grown on top of the large systems business to provide a level of computing which was just not there before. It's very much a whole new market, and the mainframe market

has not been dented by the personals because you're looking at different requirements."

Pedder's survey is also revealing good news for Britain's own mainframe manufacturer, ICL.

"ICL is getting a bigger market share and is definitely in a stronger position than a year ago," he said.

ICL is now profitable again after being bailed out by £200m Government guaranteed loans. But the cost of achieving this return to profitability illustrates one of the biggest problems of the computer industry. With advances in chip technology, making computers is no longer a labour-intensive business.

To return to profit, ICL had to cut 10,000 jobs, reducing its workforce to 23,500. Sinclair's main subcontractor, Tinter in Dundee, employs 600 people to make 100,000 computers a month; Commodore will need only 250 people to make up to 60,000 computers a month at Corby; Dragon Data's 12,000 computers a month are made by 80 people.

And the problem is, not only that making computers is no longer a labour-intensive business, but that the major reason for using them is often also to cut staff.

Two of ICL's biggest contracts—computers for the Inland Revenue and for the DSS—will lead to thousands of staff cuts. Computerising PAYE could cause 7,000 civil servants' jobs to disappear; computerising payment of social security benefits could cause up to 25,000 DSS jobs to go.

The discussion now rages over whether computerisation needs to cause such massive job loss. The debate centres over whether computerisation should be used to cut staff and save costs, or as an opportunity to retrain staff to provide new services.

As Mr David Fairbairn, head of the National Computer Centre put it, "in areas like the Inland Revenue and DSS where people want problems

solved, my recommendation is to use computerisation to make economies on routine administration and then redeploy people to give more effective advice, guidance and service."

"We have got to recognise that the non-measurable provision of advice and guidance is a valuable benefit, and not only concentrate on those things that are measurable."

This argument is echoed by the unions concerned. The Inland Revenue Staff Federation wants to see people put not just to giving more advice but also to chasing the black economy. The union argues that this would pay for itself several times over, as staff chasing moonlighters recover up to twenty times their

annual costs. It fiercely criticises the Government's approach, which it condemns as doctrinaire concentration on cutting numbers while ignoring new opportunities.

But the Government has introduced a string of programmes to try to make sure Britain does not miss out on the wealth computerisation can bring: programmes such as giving every school a computer, helping industry use and produce computers, and giving unqualified school leavers training in basic computer skills.

But the most important initiative of all could be that suggested by the Department of Industry's Alvey Committee chaired by John Alvey, director of technology at British Telecom. The committee recommended that Britain should spend £350m on a five-year research and development programme to help British companies catch up with Japan and the U.S. in producing and using fifth generation computer systems able to work at 10,000 million instructions per second and to emulate human reasoning.

The aim of the Alvey programme is to make sure Britain keeps up with the latest computer and information technology, and runs no risk of falling behind and becoming just a backward wholesaler, explained Mr Alan Benjamin of Computer Analysts and Programmers.

"Alvey could be a real circle breaker in jobs loss," he said. "It's got the emotional appeal of here is a new attempt by British companies and the Government to underpin a growth industry with real money which will create new jobs and give us a marketing edge."

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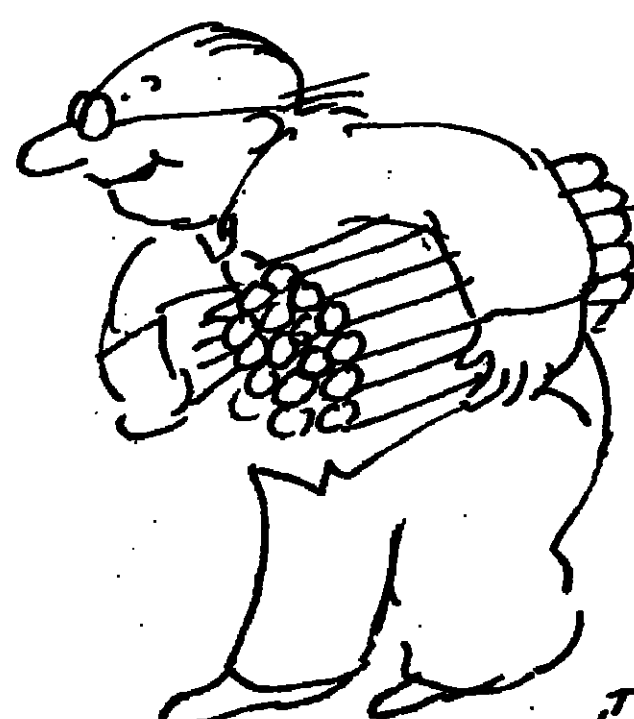
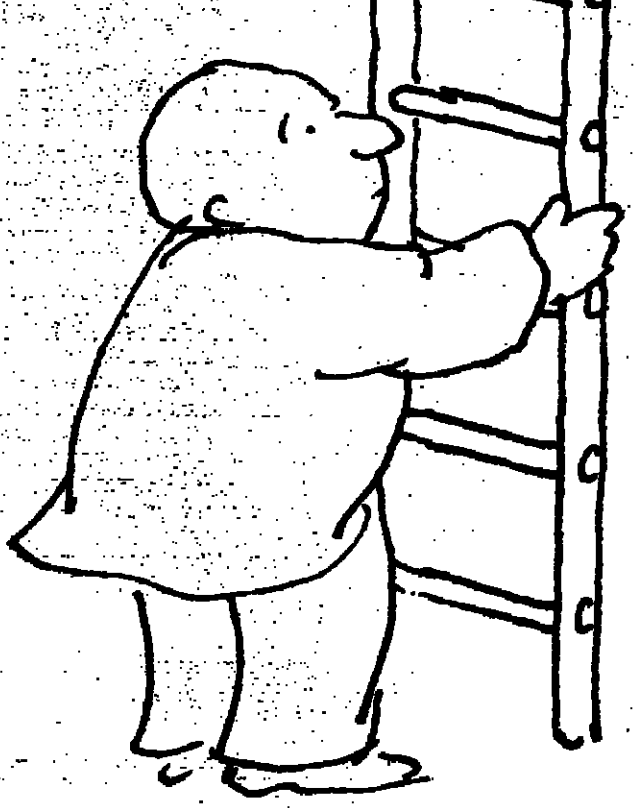
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AN EASY WAY TO GET ON TUS

COMPUTERS IN BUSINESS XVI

Automation of all kinds regarded as essential

Positive view in Japan

WHEN CONSIDERING the social effects of computerisation in Japan it is necessary first to bear in mind that the Japanese have long possessed an unusually positive and optimistic attitude towards new technology in general, and that "automation" has only very recently been viewed as something potentially threatening.

The implementation of new technology is strongly promoted by the Government as an essential means of compensating for the nation's dearth of natural resources.

It has also been seen by the Japanese as an important factor behind the successful rehabilitation of the nation's secondary industries and the recovery of international standing and competitiveness after the ruin of war.

Recent successes by high-technology industries in such fields as electronics and semi-conductors have served to reinforce this optimism.

The characteristic Japanese method is to welcome the introduction of new technology into the work place wherever and whenever possible, and to worry about coping with unpleasant consequences as and when they arise.

This receptiveness can most clearly be seen in the case of robot introduction. It is only very recently, and after robots have already been deployed on a scale unparalleled worldwide, that workers in the industries concerned, and the related government ministries, have deemed it necessary to take measures to monitor and regulate their use.

In the office environment, too, automation is increasingly regarded as an essential step and resultant changes in patterns of employment viewed as the inevitable accompaniment of modernisation for which new responses must be found.

A study of visitors to a major Tokyo business show in 1982, made by the Nippon Administrative Management Association, revealed the extent of these positive attitudes.

Asked for their first impression of office automation (O/A), 36.7 per cent of respondents expressed the view that it was

Government and business leaders speak with confidence of the opportunities for new forms of employment made possible by new technology.

"good for enterprises because managerial effectiveness is promoted," while only 5.8 per cent mentioned concern over its effect on employment among white-collar workers.

Although data concerning the level and effects of computerisation in the business world are scarce, recent studies have indicated an accelerating rate of introduction of O/A equipment and an associated decline in overall employment levels, especially among women workers.

In a survey released last year by the Labour Ministry, 81.9 per cent of a sample of 898 large-scale enterprises stated that, by the use of O/A equipment, they had achieved the goal of holding down the number of workers in the clerical and administrative sectors, in the period from 1975 to 1981.

The total workforce of these enterprises grew by 3.1 per cent during this time, but the per-

centage of women workers fell by 4.3 per cent, against a 6.1 per cent rise for male workers.

Asked about prospects for the next five years, a majority of 46.7 per cent of companies said they expected a decrease in employment in the above sectors, principally achieved through reduced recruitment and non-replacement of vacated posts.

Government and business leaders regularly speak with confidence of the opportunities for new forms of employment made possible by new technology, yet within established businesses the principal concern is often found to be the rationalisation of staff levels, with computerised operations enabling the necessary increase in efficiency.

Behind this trend is the fact that personnel expenditures are invariably the biggest outlay faced by large Japanese enterprises, which are bound by convention to reward employees by seniority of age rather than by productivity, and to offer full-time staff lifetime employment benefits.

Many companies, hard-pressed by the recession, are now utilising O/A equipment to free full-time male staff from non-productive office work, and reallocate them to active sales positions. Meanwhile women, whose employment is typically on a more temporary basis, and less well paid, are frequently being channelled into the computer-equipped office jobs. As it is these office tasks which are being most effectively rationalised, the female work force is gradually being seen to decrease.

As an additional result, young women seeking jobs are increasingly finding it necessary to

offer O/A skills: in particular the ability to use word-processors, which are spreading very quickly with the arrival of improved Japanese language software. Some new computer-related opportunities for employment are arising, notably in the software industry.

Male software engineers are in seriously short supply in Japan, and this has increasingly led major electronics companies to recruit women college graduates. The demand for women in temporary office positions, using computerised equipment, is also growing fast, and staff agencies are enjoying a new market for women with O/A experience.

Problems in the software industry are not confined to

A particularly thorny issue, under review by the Finance Ministry, is the introduction of electronic and home banking.

staff shortages. A 1982 study of 6,000 workers in small and medium-sized data-processing service companies found that because of difficult and strenuous working conditions about 70 per cent of computer programmers and systems engineers below the age of 28 want to quit their jobs by the time they're 35, and 30 per cent reported serious work-related illnesses within the preceding year; further reason perhaps for viewing the field as a young person's calling.

Progressive in O/A introduction is fast-moving, but there remains a heavy reliance on the written word and telephone



Japan's receptiveness to new technology is most clearly seen in the case of robot introduction, as in vehicle production, above. Now, in the office environment, too, automation is regarded as an essential step forward by large scale businesses.

communications in the Japanese business world. One recent estimate put the cost of paper documentation in the single area of foreign trade transactions at ¥2.5 trillion annually.

The Japanese fondness for handwritten business messages is one reason for such inefficiency, but a factor of wider, political significance is the liberalisation of data communication services being fought between the Posts and Telecommunications Ministry and the Ministry of International Trade and Industry (MITI).

A monopoly on data and information transmission circuits is held by the government-capitalised Nippon Telegraph and Telephone Corp. (NTT), and the international communications carrier KDD.

MITI, representing the views of a wide cross-section of industry, is seeking the total liberalisation of on-line data processing, with restraints in-

troduced only where necessary to maintain orderly business. The P. and T. Ministry prefers to move in the opposite direction, maintaining its overall controls and issuing licences on an individual basis.

Some measure of compromise has been reached through revisions of the Public Telecommunications Law, the most recent of which, last October, allowed enterprises with a maximum capital of ¥100m, and specific inter-business relations, to engage in VAN (value added network) services.

Generally speaking, however, the use of circuits by private circles is still confined to computerised "information processing," while "communication services" for the sending of transaction information is restricted.

The P. and T. Ministry has also expressed concern about the "sovereignty" of Japan's internal communications services, if liberalisation is allowed. MITI here again takes the opposing view, stressing the importance of improved foreign access to the Japanese business world at a time of serious trade friction.

A particularly thorny issue, now under review by the Finance Ministry, is the introduction of electronic and home banking. The traditional banking services fear that outside monetary institutions such as credit companies and postal savings organisations could undermine their position by use of data communications facilities, if controls are not maintained.

On the other hand, excessive efforts to co-ordinate the moves of the mainstream banking organs might damage their competitiveness. Banks are also worried about heavy computer equipment investments, the problems of maintaining user-confidence over the question of data protection and the effects of placing computer terminal units in homes and businesses could have upon the traditional role of the bank counters.

Employment levels in banks have fallen as fast as anywhere, especially through computerised teller service equipment. Toshiba Corporation has just launched a new range of bank-note handling machines, capable of counting and sorting 600 notes per minute, an example of the continuing improvement in streamlined banking operations, which promises to affect staff levels further.

However, despite the increasingly apparent problems computers are bringing to Japanese society, optimism prevails. A leading industry watcher, Professor Shoji Tanaka of Tokyo University, put it this way: "The negative effects of automation are emphasised too much—we must find a new way of life, a new way of production, after the introduction of new technology. We Japanese believe we can do that."

Roy Garner,
Tokyo

Business market for small machines boosted by the government

French learn to love computers

FRENCH BUSINESSMEN wooed by government promotion and an increasing number of foreign electronics manufacturers bursting on to the market, are learning to love computers.

Hampered by an inefficient distribution network and a contradictory profusion of government-backed information technology campaigns, in the past France has been a relative laggard in the computerisation stakes compared with the UK and West Germany.

The signs are that this is now changing. Although sales of large mainframe computers—where the market is dominated by IBM and the heavily loss-making nationalised CII Honeywell Bull—are growing at a relatively steady pace of about 10 per cent a year, the business market for small computers is booming.

According to the market research organisation Intelligents Electronics, which has carried out surveys of the main European computer markets, French sales of microcomputers for business and professional use are expected to reach 85,000 units this year and 115,000 in 1984, against 52,000 last year, 32,000 in 1981 and only 16,000 in 1980.

Computer manufacturers speak of a growing trend towards installation of machines in small businesses or in decentralised departments of larger companies. Marketing efforts are being aimed less towards computer specialists and more towards businessmen themselves as the end user.

France's wide-ranging network of computer servicing and software companies—many of them small, local concerns in an excellent position to assist the computerisation of small firms—is certainly an important support in the Government's efforts to propagate information technology.

"We are going to become more and more a marketing company," says M. Bernard Molland, distributors' sales manager at CII HP.

The state-owned company, traditionally concentrated on mainframe manufacturing, has just restructured its operations to put greater emphasis on microcomputers, where its chief

products are the Mical/Questar range.

Software houses play an important part in CII HP's indirect sales network, through distributors and agents around the country. "Up to now, computing has always been a technical world," says M. Molland. "Now, we are not exactly selling soap—but it's something like it."

M. Alain Bourdeley, marketing director of the information systems division at IBM France—which is reputed to have about 50 per cent of the total French computing market—says that up to two or three years ago, few small businesses of less than 200 employees were interested in computers. "Now,

Total spending on French information technology in 1981 was about 6 per cent of world expenditure.

with the entry of higher performance machines, the market has become dynamic."

IBM's own personal computer, introduced in Europe at the beginning of the year, itself is expected to lead to a revolution in the French business computer market. Together with the expected increase in France of Digital Equipment Corporation's Rainbow business model, new entrants should pose strong competition for the present market leaders in the French business computer sector: Apple and Commodore.

Intelligent Electronics estimates Apple took 23 per cent of the market for business micro-computer sales last year. Tandy and the main French manufactured products—Gomfil, Mical and Lagabax—also had significant percentages, as did Hewlett-Packard and Sharp.

The organisation says that early indications on the success of the IBM model are "very promising," and this unit should become the market leader in the French business sector.

A recent report from the Government's Planning Commission estimates that total spending on French information technology in 1981 was about FF40bn or 6 per cent of world

CONTINUED ON NEXT PAGE

THE NEW NCR 9300

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1. New state-of-the-art customised 32-bit VLSI chip set

Four VLSI chips—a Central Processor Chip (CPC), an Address Translation Chip (ATC) and two System Interface Chips (SIC)—are the heart of the 9300.

Together, these chips share the 9300's workload so that you realize the power and performance of three types of microprocessors instead of just one.

2. Ten boards of electronics reduced to one reliable VLSI chip

Using Very Large Scale Integration, NCR now puts the electronics of ten 11"x14" printed circuit boards on the Central Processor Chip no larger than a penny. Not only does VLSI save space, it eliminates almost all of the vulnerable electrical connections where system failures usually occur.

3. Guarantee your data integrity with memory scrubbing

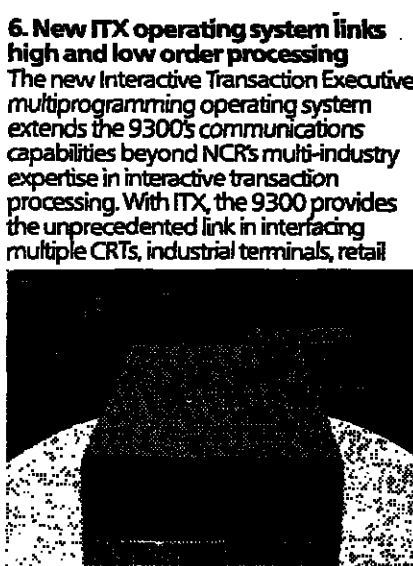
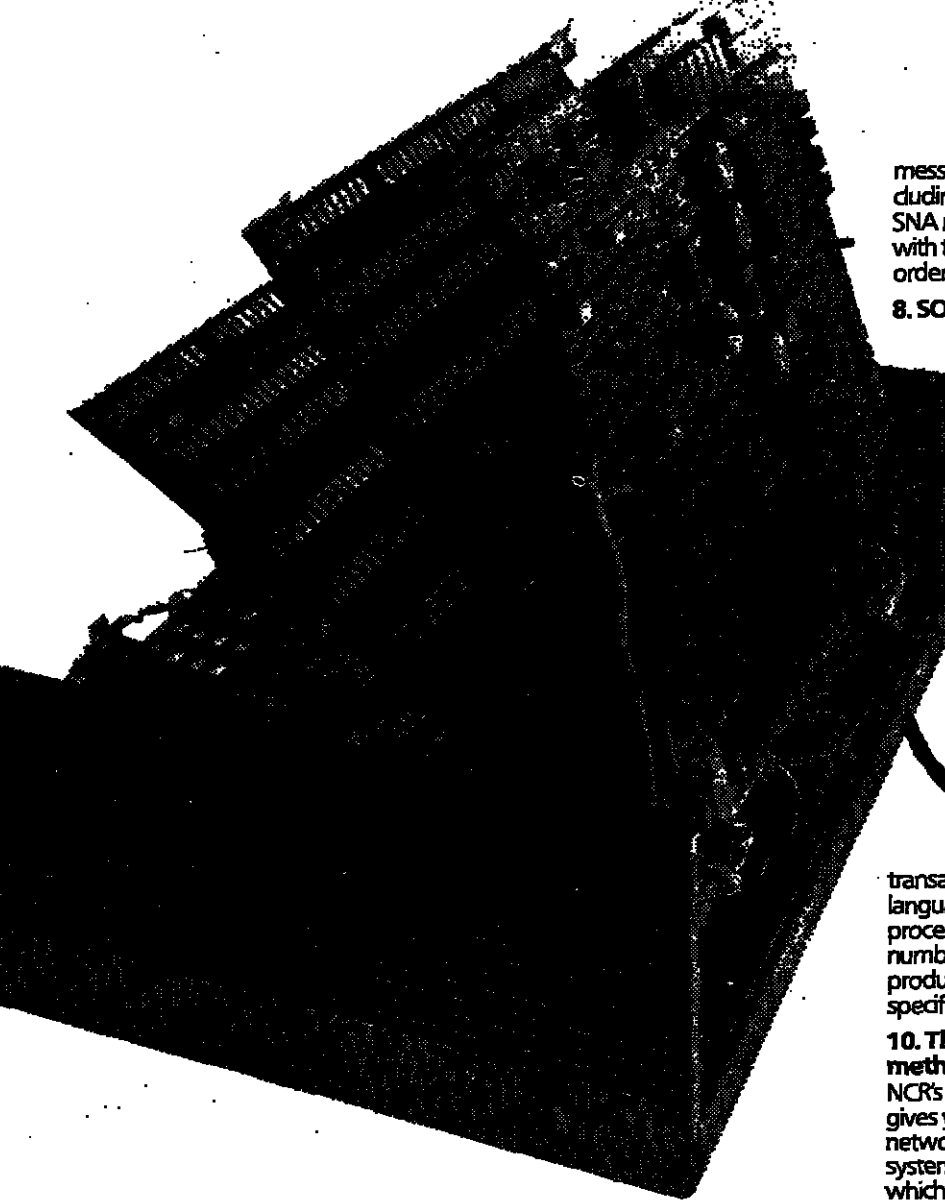
NCR's newly patented memory scrubbing method cleans the 9300's four megabytes of main processor memory every 16 seconds! It does this by correcting any transient single-bit errors—effectively eliminating catastrophic double-bit memory errors. All of this is done automatically by the Address Translation Chip with no central processor overhead.

4. Mainframe power in a two cubic foot, fifty-pound box

With the 9300, you can put full 32-bit VLSI power almost anywhere. The 9300 weighs only fifty pounds and measures a scant 7.5'x17.6'x25.8". The processor requires no special air conditioning or humidity control. In office or computer room, put the 9300 processor wherever it's convenient for you—even on the wall.

5. Uses a standard 240-volt outlet while cutting power consumption 90%

The 9300 uses only 0.4 KVA compared with the 4 KVA requirements of comparable mainframes. Plus, there is no need for heavy-duty wiring. The 9300 runs on readily accessible voltage and conventional wiring.



The Terminal Application Processing System (TAPS*) takes the complexity out of transaction processing. It works with

ITX to provide efficient and consistent handling of transactions. It provides standardized coding to simplify development of sign-on, sign-off and security procedures, the design and sequencing of screens and the editing of data formats. It takes transaction processing out of the application programs.

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7. Choose your computer environment—Host, DDP, SNA

The 9300 has the unsurpassed ability to work for you in a host environment, in a peer-to-peer Distributed Data Processing environment and in an SNA network. Whatever your choice, you get the communications support you need—SDLC, X.25, BSC, DLC, TTY and ISO-Asynch. And the 9300 integrated communications allow you to connect up to 42 lines. In a DDP environment, the 9300 supports

message passing between peers, including NCR's IRX, IMOS, and VRX. In an SNA network, the 9300 provides you with the vital link between high and low order processing.

8. SOLON—a revolutionary way of creating programs without programming.

Now, almost anyone can create computer programs by answering simple questions. NCR's new application development system, SOLON, helps the business professional or EDP expert to create application programs in a fraction of the time necessary for traditional methods. Think of it! Cut your EDP backlog from years to weeks—just as fast as you'd like.

9. Powerful software tools increase productivity

Supportive software for the 9300 increases programmer productivity. You get

transaction support capabilities, a query language, a report generator and a word processing system. In addition, there are a number of other software development/ productivity tools available for your specific requirements.

10. The strengths of three data base methods in one

NCR's data base management system gives you the strengths of the hierarchical, network and relational models all in one system. It is a relational environment which complies with CODASYL specifications. So you are assured of data integrity, elimination of data redundancy, data restructuring with minimal program impact, and data access through multiple paths. And all enhanced by our query language and other optimisation tools.

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COMPUTERS IN BUSINESS XVII

How the French see it

CONTINUED FROM PREVIOUS PAGE

expenditure — putting the country in fourth place behind the U.S. (54 per cent), Japan (45 per cent) and West Germany (7.5 per cent).

In individual areas, such as the introduction of computers in schools, France is lagging far behind its neighbours.

The Government's aim under its ambitious electronics programme is to hold France up to the world's third largest electronics power by the end of the decade. A controversial report recently drawn up by M. Philippe Lemoine, a civil servant in the Industry Ministry — not yet officially published — showed that France still has a long way to go.

France's share of the total European computer market fell to 19.5 per cent in 1981 from 20.7 per cent in 1978, well behind West Germany with 28.5 per cent. The report pointed out that, according to certain studies, the French share could fall to 17 per cent by 1985, in third place behind Germany with 30 per cent and the UK with 20 per cent.

The Government is trying to make up the lag by putting increased sums into key projects such as computer-aided design, education, translation apparatus and the establishment of a large industrial and scientific computer.

Small projects which catch the eye abound. Recent examples include plans to install computers to aid travellers on the Paris-Metro and a computerised information system for estate agents.

The Government expects that by 1985 each French person will come into contact with a computer 10 times a day, compared with just twice a day in 1978.

A proliferation of government agencies exists — too many, according to the Lemoine report — to try to promote "informatics." The Mission à l'Informatique is the government's main arm implementing the preferential purchasing policy in favour of French equipment in the administration and public enterprises.

But the most important tool to promote the wiring-up of small businesses is the Agence de l'Informatique, a public agency set up in 1980 to bring

COMPUTER USAGE IN FRANCE

This table indicates the increasing percentage of smaller systems valued at FFfr 50,000 to FFfr 250,000.

	Total number of French computers installed	The number valued at FFfr 50,000 to FFfr 250,000
1971	13,016	6,680
1972	16,238	8,982
1973	20,915	12,963
1974	26,380	18,187
1975	31,453	21,423
1976	36,670	25,461
1977	44,389	31,997
1978	51,716	37,572
1979	60,988	44,240
1980	74,406	54,553
1981	94,035	67,995

Source: Government Planning Commission

the electronics sector into contact with end users across the whole of manufacturing and service industries.

Last year the agency spent FFfr 265m on promoting information technology, including industrial applications such as robotics. Most of the money was spent on research and development, and grants — on which the agency receives royalties in a subsequent year — to companies and industrial federations purchasing computer equipment.

According to government statistics, in 1980 about 67 per

cent of many small family-run companies in France have not benefited at all from the Government's cuts in working hours. The patron simply got fed up with working overtime on repetitive bookwork — one of the strongest sales points for computers, according to one marketing manager.

A newly-published survey from the Compagnie Bancaire banking group underlines that, whatever the precise reason, small businesses are indeed jumping very quickly on to the computer bandwagon. The results of a questionnaire sent to 22,000 small companies of between 10 and 200 employees (out of the 100,000 or so of this type thought to exist in France) showed that 38 per cent had their own computer in 1982 against only 25 per cent in 1981 — and the percentage is expected to rise to 51 per cent by the end of 1983.

The survey showed that cuts in costs — most companies recently computerised bought equipment for less than FFfr 70,000 — represented the main factor behind the jump. The biggest growth rates expected for this year are coming from the smallest enterprises of fewer than 50 employees.

Computers are spread most strongly through small businesses in the wholesale trade, with about 60 per cent wired-up last year. Most remain to be done, however, in the building and public works business, where only 22 per cent were computerised.

Significantly — and showing that there is indeed a link between government intervention and the needs of the market — the construction sector is one of the chief areas where the Agence de l'Informatique is concentrating its promotional efforts.

David Marsh

Comecon picture is of an extremely patchy performance, says Anthony Robinson in Moscow

Soviets struggle to keep up

THE LARGE scale computerisation of Soviet industry and the mass introduction of computer-controlled robots is seen by Soviet planners as one of the best ways of increasing the productivity of labour and capital.

The urgency of the task has been increased by demographic trends which see a progressive decline in new entrants to the labour force over the present decade and beyond, and by growing concern over the diminishing returns achieved by the investment of capital.

Development of computers and robots has become one of the priority tasks of Comecon co-operation, with the Soviet Union concentrating on the production of main frame computers and industrial robots for heavy industry. East Germany and Hungary are forging ahead with micro-computers, while Bulgaria is concentrating on floppy disks and software.

The introduction of computers throughout Comecon is lagging way behind the West and the gap appears to be widening as the pace of development in Japan, Western Europe and the U.S. takes Western industry into ever more sophisticated fields.

The gap is especially large in the service industries which are themselves a generally backward area.

The banking and retail distribution systems, which are big customers of computers in the West, are still at a primitive stage in most Comecon countries and particularly in the Soviet Union.

Checking accounts, for example, are unknown to Soviet bank customers, even for foreigners holding hard currency accounts in the foreign trade bank.

The shabaz is still the main accounting device, not only in shops but also throughout industry and commerce where millions of people are employed painstakingly preparing accounts, work schedules and calculating wages and bonuses by hand.

Clearly, however, the use of computers is much more advanced in certain specific sectors of Soviet industry — and especially the military economy which is the largest and most developed single sector. A country which can maintain a sophisticated space research and development programme,

build sophisticated missiles and aircraft and strive continuously to achieve strategic parity with the United States needs sophisticated computers to do so.

Practically nothing is known, however, about this huge sector which operates in the strictest secrecy.

Western computer experts believe, however, that many of the computer systems working in the most sophisticated sectors of the Soviet military economy are essentially hand-built, special purpose machines incorporating significant amounts of Western technology, some bought openly but much of it imported clandestinely to avoid Comecon restrictions.

The general picture which emerges in sometimes surprisingly frank discussions of the problems affecting the introduction of computers and computer-linked technology into Soviet industry is that of an extremely patchy performance.

6 A country which can maintain a sophisticated space research and development programme, build sophisticated missiles and aircraft ... needs sophisticated computers to do so.

with considerable reluctance among many traditionally-minded managers to adapt to the new techniques required if computers are to be effective.

In January last year, the Siberian branch of the Soviet Academy of Sciences held a fascinating round table conference to which it invited the directors and leading specialists at the enterprises and research institutes of the Ministry of Machine Tool Industry, the Ministry of the Electrical Equipment Industry, the Ministry of Instrumentation, Automation, Equipment and Control Systems and various research institutes connected with the Soviet Academy of Sciences.

Mr Victor Khabalov, manager of the Ivanovo Machine Tool Association which produces inter alia multi-purpose numerically controlled machine

tools, frankly admitted that the Soviet machine tool industry is 10 to 15 years behind the West and warned: "The world won't wait for us. Every year brings a new generation of electronics. We need to find ways of getting new machine tools into production fast and provide economic incentives for doing so."

The question of incentives is now at the centre of a lively debate aimed at trying to reform the nature and value of output and introduce a more sophisticated set of indices which encourage rather than discourage innovation.

One result of the present system of planning indices and bonuses is that Soviet machine tools are much heavier, as well as much more primitive than their Western counterparts, and to have any chance of export industry is that of an extremely patchy performance.

The conservatism of many Soviet machine tool manufacturers was underlined by the director of the Ivanovo Carding Plant who told the round table that they needed automated lines but could not afford those available from existing Soviet machines and finally had to buy 60 such lines from Switzerland.

"There is still some machinery that we have been trying for 30 years to order from Soviet industry, but still can't get," he added.

Part of the problem is that Soviet industry is organised on the basis of huge, multi-purpose plants and combines with a virtual absence of the kind of small specialist companies which have proved to be the main vehicle for rapid technological innovation and computerised systems in the West.

Research institutes, of which there are a vast number employing a huge number of scientists and technicians, are also frequently ivory towers, out of touch with the needs of industry, even though their members often display excellent awareness of the trends and achievements of the Western computer industry, obtained through western specialist publications and other channels.

Nikolai Smirnov, chief designer of numerical control systems at the Krasnodar Instruments, Automation Equipment and Control Systems, Nikolai Smirnov, chief designer of numerical control systems at the Krasnodar Instruments, Automation Equipment and Control Systems,

analysed the task facing the Soviet industry: "It is time for us to shift from numerical control equipment that employs relatively little integrated circuitry, and change to broad capability equipment that employs micro processors, large integrated circuits and micro-computers."

"Such equipment has been designed and is now being put into production..." At this point, however, he was interrupted by Academician Aganbegyan, perhaps the most

6 Glory to the Soviet microchip — the biggest microchip in the world? — a Soviet official's wry propaganda slogan.

brilliant and outspoken of contemporary Soviet economists, who added sharply: "Your systems are not dependable enough."

When Mr Smirnov attempted to refute his critics by saying that "most of our systems are worse than imported equipment" one of the users of his machines added: "An analysis of pertinent information shows that there have been numerous complaints about numerically controlled machine tools. Most of the downtime is due to breakdowns in their electronic systems."

At this point, Mr Smirnov came back with the view that "we cannot hope to develop the best numerical control systems when it takes years to get industry to start producing the necessary electronic components... even though we will finally be getting improved memory components in the near future, the capability of our computer units is still too low to bring us up to world standards."

"The rated capacity of the micro-computers we have to work with is low, only 40,000 operations per second and their capacity in operation is even lower," Mr Smirnov added.

Having revealed the low capacity and effectiveness in operation of the basic components of the Soviet computer industry, Mr Smirnov turned to the question of the Soviet microchip — the biggest microchip in the world."

Finally, they agreed on a slogan. It ran: "Glory to the Soviet microchip — the biggest microchip in the world."

tion, went further to criticise the effectiveness of the Elektronika NT-31 machines which have been presented as the acme of the Soviet computer industry.

"Because of the exaggerated claims for the Elektronika, some excessively optimistic conclusions have been drawn as to the sophistication of the electronic components that are available in our country," he said. "The claim that NT-31 is a real time control system is illusory."

"In reality, it is nothing but a traditional numerical control system that's harder to program. I think that the NT-31 developers mindlessly copied experimental models put out by leading Western firms."

Old fashioned, unreliable components and the slowness of Soviet industry to respond either to the demands of computer users or world trends are only some of the problems, however. The innate conservatism of so much of Soviet industry and the inability or reluctance to introduce modern management methods is perhaps the most basic problem — and the most difficult to eradicate.

This is becoming apparent as Soviet managers to develop and quickly introduce computer controlled robots.

A recent article in Pravda stated: "The rapid progress of this technology is being impeded by a shortage of scientists and designers and a persistent under-estimation of the role of robots in carrying out the comprehensive mechanisation and automation of equipment and production processes."

All in all, the development and introduction of computers and computer-related disciplines into Soviet industry seems to be fraught with enormous difficulties which are intensifying the need for thoroughgoing reforms of the entire planning system and the attitudes of labour and management.

The sense that Soviet industry is lagging behind and is likely to lag even further behind is summed up by the following apocryphal story told by a Soviet official.

Protagonists were looking for a slogan to encourage and stimulate the Soviet computer industry.

Finally, they agreed on a slogan. It ran: "Glory to the Soviet microchip — the biggest microchip in the world."

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COMPUTERS IN BUSINESS XVIII

Here, and on the next two pages, specialists highlight the main advances in hardware and software, and indicate the trends

Advances in hardware

EXCITING THOUGH it is to look at the work being carried out in the laboratories of the major computer manufacturers and their suppliers, such a view will not give us a clear picture of hardware developments.

The trail from the research and development laboratory is a maze of dead ends and false starts which is littered with promising technology that never found a sizable place in the marketplace.

There are nine developments in the marketplace, however, which, taken together, clearly show where computer hardware is going over the next five years—that is as long as a hitherto discounted technology does not come along and steal the thunder of more pedestrian technologies now under consideration or under production. It is instructive to head the list with a disappointment in

Little has come on to the market to take advantage of flat screen technologies.

one of the most neglected but fundamental areas of computer technology—the methods of presenting data to the user.

The industry has standardised on the cathode ray tube, used in domestic televisions, for a long time now. Indeed the length of the tube determines the length of many products, like personal computers and terminals.

Little has come on to the market to take advantage of flat screen technologies to follow up Burroughs' screens used on small business machines over eight years ago. Grid Systems, a fast growing U.S. company, has produced a portable computer with a flat screen and Olivetti has plans to do so. But other manufacturers are still dependent on cheap cathode ray tubes, made by the handful, to provide that essential visual link with professional and non-professional users.

Continuing the theme of ease of use and presentation, keyboards designed with some thought for the operator are at last being offered by vendors, many of whom have been influenced by the designs of Scan-

davian supplier Ericsson. Wang's new Professional Computer, for instance, has the type of keyboard that professionals and typists will find easy to use.

The standard data processing keyboard is still, however, governed by outdated designs which rely on the manual typewriter for their inspiration. In the past two years memory chips which store 64,000 bits of data have become the standard memory products.

Fearsome competition between U.S. and Japanese suppliers has driven the price down to a level and in volumes sufficient to appear in every computer product.

These memory developments pave the way for corresponding developments in the processors made by using the same Large Scale Integrated (LSI) manufacturing processes. VLSI techniques allow chip manufacturers to build processors which can take a word length of 32 bits, for years the standard for mainframe computers and only recently achieved by minis.

A greater word length allows the designers to establish a more complex instruction set and allows the processor to shift greater blocks of data faster. Commercial products incorporating 32-bit processors are now coming onto the market, led by Hewlett Packard, which continues to keep its chip developments in line with the industry's best.

Several chip vendors are taking the intermediate step to 32-bit working processors by providing the power through a set of chips instead of a single chip. All this provides more computing power in which to bury the relative inefficiencies of software development, giving users more functions.

The continuing production and design developments which underlie chip memory capacity increases and more powerful chip processors are also opening up an avenue of development of system vendors which has a knock-on effect right throughout the industry.

Processor architectures which have become commonplace and for which there is a lot of software available, such as Digital Equipment's PDP 11 range of minicomputers, are now being implemented in small chip sets.

These can be used to provide processors for small business systems or can be attached to machines providing control functions. Taking established processor architectures down into silicon creates a stability in computer usage which has meant that the vast investment in existing software can be transported across a whole range of processor powers with little or no amendment.

The rewards of these chip developments would be lost if peripheral devices such as storage units and printers were hard at getting this film technology out to users and they have begun shipments of their new disk drives.

These developments will allow still greater amounts of data to be held online for immediate access and will eliminate some of the production bottlenecks which large users face.

Right at the other end of the spectrum, in the personal computer market, the existence of the floppy disk drive has been an essential component to the growth of the market. Data is stored on a flexible disk about

offer and are willing to make their own choices while the standards are still under discussion.

A UK order for £2m worth of local area network systems to link up parts of the air traffic control centre is just the beginning.

First shipments are also being made of a new generation of private automated branch exchanges, PABXs, which are based on computer technology and are equally at home processing voice messages or data messages.

The UK market for these PABXs has not yet been lost by UK vendors, unlike many other information technology markets where early UK leads have been whittled down by superior marketing skills and greater capital resources. Plessey is able to hold off the challenge of U.S. and Canadian vendors, at least in the first round of such moves.

These developments in hardware all add up to the fact that considerable advances in the price performance of computer systems are realisable and should continue.

Although ICL does not have a sizeable stake in the world information technology market, it can still achieve price performance increases which provide a good example of how the industry has moved. ICL has been able to achieve a 30 per cent improvement in its ME29 small mainframe over the last two years, due mainly to the falling cost of computer memory and the more powerful generations of chips now available.

While providing these improved products for system vendors to use, the chip industry is looking ahead to the next generation. There seems to be general agreement that a new type of chip called Complementary Metal Oxide Semiconductor (CMOS) will provide what is demanded in the 1990s.

The recent International Solid State Circuits Conference provided a forum for debating the type of CMOS production which would provide the right trade-off between speed of processing, size and power consumed. As the chip industry juggles with these parameters, users struggle to get the most out of their system, whatever its size.

Richard Sharpe

at Hemel Hempstead in the size of a single record and which is kept inside an envelope.

Storage capacities for these disks have been doubled as the read/write heads inside the drive have become more sophisticated. The whole size of the drive has also been shrunk so that multiple drives can be integrated into a complete microcomputer.

Many of the personal computers now being bought for business use will have to communicate with other personal computers or larger computer systems to get or send essential data.

Communications hardware is therefore an important area of development, especially the communications hardware to get small and medium-sized computers talking to each other when they are in the same building. These local area networks are still an area of considerable standards debate, often held at a level of obscurity common to theological discussions.

Large orders for local area networks are, however, now being placed, a sign that customers both need the solutions on

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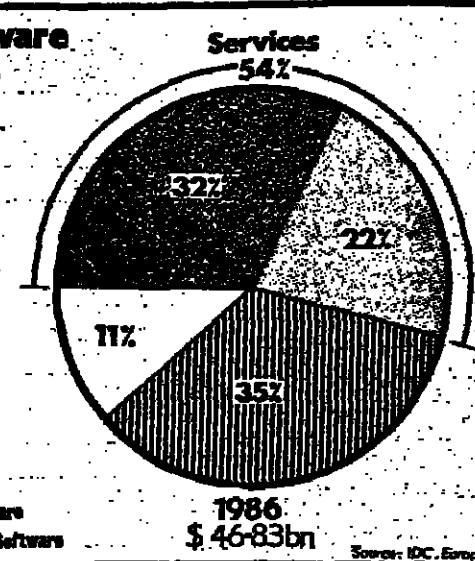
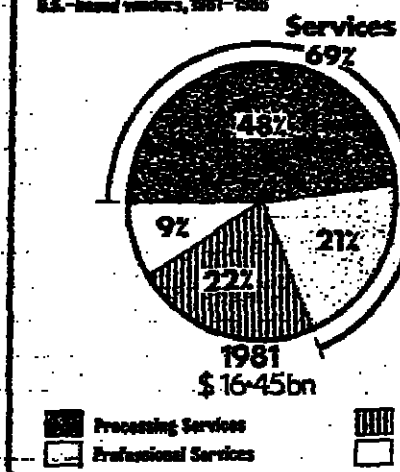
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Computer Services and Software

Market segmentation of worldwide value-added services market, U.S.-based vendors, 1981-1986



Many of the functions that the man in the street believed computers could carry out years ago are only now becoming commonplace through better software. In particular, only now is sophisticated software being written to make microcomputers into true business machines rivaling mainframes in a minute in their power.

Links between machines increase communications

Networks bring useful benefits

MOST BUSINESSES today realise the importance of good communications for the efficient running of their companies.

The telephone has, of course, long been essential. But similarly, computers are increasingly being introduced to operate many aspects of companies' activities, from controlling machinery and production processes to payroll work and accounting. They are also found in the form of word processors, producing letters and documents.

As well as the large central computers, used in payroll and accounting, small personal computers are making their appearance in a host of applications throughout companies. They may, for example, be used by managers to estimate company performance while, elsewhere in the building, a researcher may be running experiments on a different machine.

It becomes increasingly desirable that these smaller machines can link into larger computers, to communicate with each other, to give access to more information or simply to share costly facilities, such as printers, or on discs, on which information can be stored for later use.

In a local area network, one ring of cable links all the equipment. A single network could

serve an industrial plant, office building or a small research laboratory.

Before the advent of the local

A single network could serve an industrial plant, office building or a small research laboratory.

area network, a computer would have to be directly connected to other equipment, thus limiting where equipment could be sited around the building. Printers and other peripheral equipment had to be close at hand because so many cables and wires were needed to link them together so it was easier to have short runs of cable. It is difficult to keep track of each cable and there is only a certain amount of run in ducts to accommodate any expansion in the system.

In a local area network, one ring of cable links all the equipment. A single network could

serve an industrial plant, office building or a small research laboratory. For much larger applications several rings may be needed, all of which could be connected and controlled by a master ring.

Today, there are many different types of local area network on the market. In principle, they operate by sending packets of data around the ring all with individual addresses. These addresses relate to the equipment which is connected to the cable. So, only the machine with the correct address will receive data addressed to it—all the other equipment on the network will ignore the information as it flows around the ring.

Some of the best-known LANs are Ethernet, developed by Xerox, and the Cambridge Ring, designed by Cambridge University. Several commercial versions of this LAN are now on the market, including Polynet VTS, produced by Logica in the UK.

One of the earliest pioneers of local area networks was Datapoint. This U.S.-based small computer and telecommunications group introduced its ARCNET system as early as 1977.

LANs vary in sophistication.

CONTINUED ON NEXT PAGE

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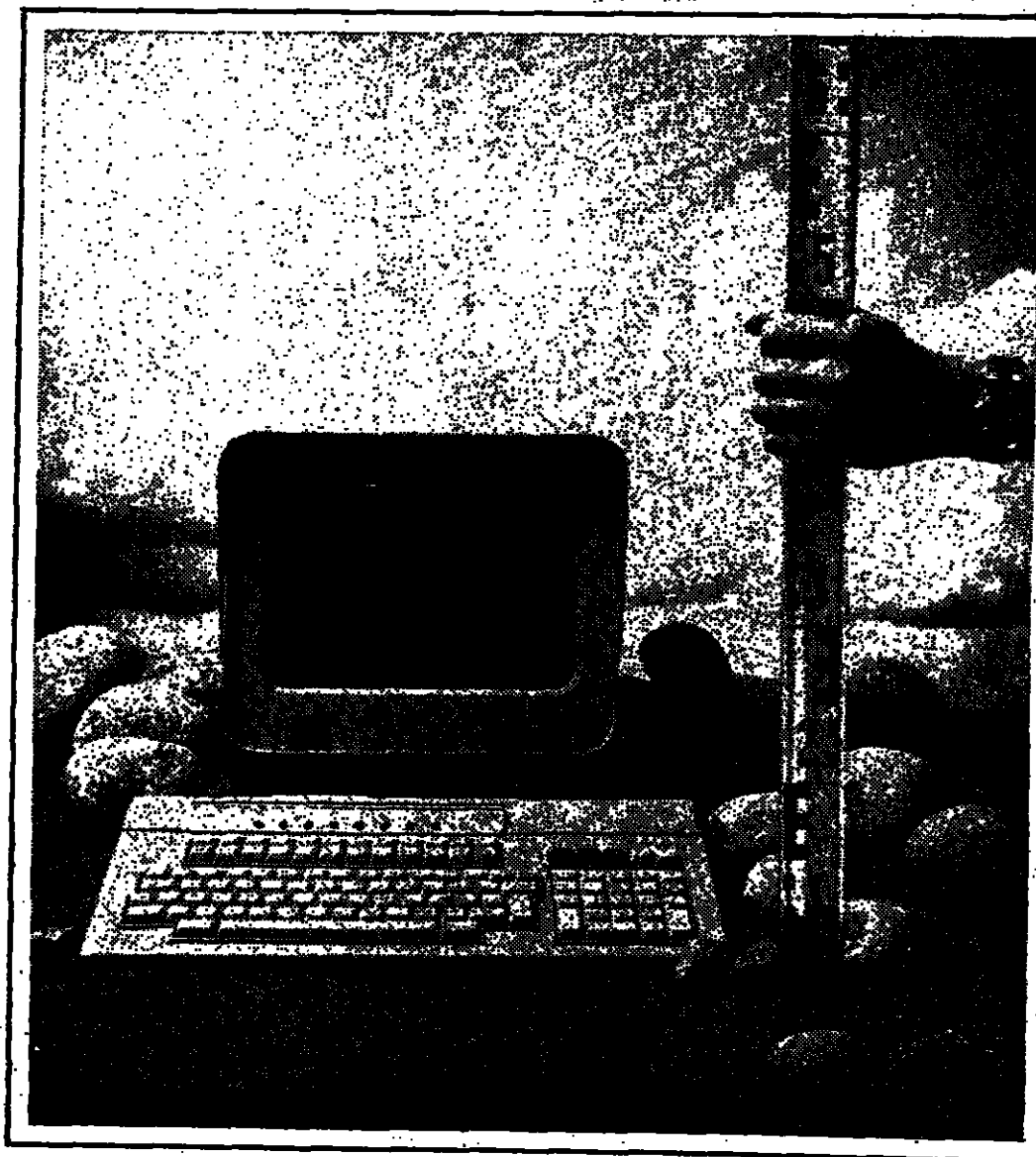
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COMPUTERS IN BUSINESS XIX

The minicomputer has brought a revolution in software systems and packaging

Message of the little boxes

IT IS INTERESTING to speculate whether the data processing industry would ever have thought of making computers accessible had it not been for the advent of microcomputers. The cheap, highly functional little boxes that flood high street shops have taught the so-called professionals a thing or two about that all important interface between people and machines—not least of which is how to package it.

The jargon term for computer systems which do not rely on a knowledge of jargon, and therefore offer a useful person/machine interface, is "user friendly." Large mainframe computer systems and their immediate successors, mini-computers, were not user friendly. Putting it another way, they were badly designed.

Only since microcomputers have taken computer power out of the laboratory and the computer room, has there been any real concern over making computer systems easy to use.

There are several approaches to improving communications between people and machines and they all ultimately rely on software. Like a car without a driver, a machine without software is useless.

Perhaps the first successful attempt to improve the design of computer systems was the use of the highly popular Visicalc package which helped so much to make microcomputers appeal to the business

person. For the first time a computer could do something which directly related to the person's work and did it in a "language" that real people could understand.

The success of Visicalc has done a great deal to stimulate experimentation in improving interfaces and the package has been followed by a number of spinoffs from the Visicalc idea of presenting and manipulating information in tabular form.

Ironically, at the other end of the computer spectrum, in the ivory towers of IBM research laboratories, scientists have for several years been experimenting with presenting information in table form. Since one of its researchers, Edgar Codd, put forward the idea in the early 1970s, the relational database, as it is called, has been seen as a possible solution to the interface problem.

Like Visicalc, the relational view of data sees everything in terms of rows and columns. It sounds simple and, in fact, it is. The problem comes in implementing the idea in software—an area where the people who built Visicalc moved over IBM. Granted IBM's project is aimed at providing a general-purpose solution to the problems of presenting data to the people so that they might understand its structure, Visicalc was aimed at giving non-programmers a way to use a computer as a combination of pencil notepad and calculator.

Visicalc is only a step on the way, however. It still relies on a typewriter keyboard for input and a straightforward numeric display for output. Far more exciting things are just beginning to emerge which should help to bridge the chasm between the computer system and those who must use it.

The typewriter keyboard predated the invention of computers by half a century and is an anachronistic hangover from a more cumbersome mechanical age. It exerts a tyrannical influence over the way the computer systems are used—not least of which is the precision required to use one.

Building on work initiated by Xerox at its Palo Alto Research Centre in California, Apple Computers has brought a new means of providing input to computer systems with the idea of the "mouse." Its much publicised Lisa system launched earlier this year is yet another example of the micro stretching the boundaries of interfacing beyond the tried and tested methods of keyboard input and numeric output.

It makes using a computer system like playing a video game. By moving the mouse around on your desk you can get an electronic representation of the same to move about on the screen in front of you. In the Lisa system, and the Xerox Star system which preceded it, the tyranny of the keyboard has at last been overcome.

The other side of Lisa is the use of graphics to represent the structure of the task being performed. If the computer user wants to scan through a file of information, for example, the file is shown graphically upon the screen giving a pictorial representation of how the data is organised. By simply pointing at a particular item, the user can bring it forward for processing.

Graphics has already made some considerable impact on the way that data is represented. Instead of showing data in purely numeric form, it can be represented as pictures. These pictures—whether as pie charts, histograms or straightforward graphs—can convey the important part of their message much more quickly.

The other thing about them is that they are inherently "vague." A good analogy is the difference between a digital watch (numeric representation) and an old-fashioned clockwork watch (nowadays referred to as an analogue watch). The latter

provides us with an approximate picture of what the time is very quickly.

The former gives a precise indication of the time but it takes us a while to work out what it means.

Generally speaking the picture is more convenient. We would rather think of it being "about half past ten" rather than 10.31 because half past ten means something to us (nearly time for morning coffee). So, the vague pictures that a graphics system can use to give an indication of value (a rising line indicating increasing sales for example) is far more useful to us than a stack of figures.

This theme of vagueness is also being pursued as a project in its own right.

The London Business School has been working on ways of applying advanced mathematical theories to the job of designing systems. One theory—again emanating from California—is Lotfi Zadeh's theory of "fuzzy logic."

Zadeh, a cyberneticist, argues that we tend to think of things in vague terms. At LBS attempts have been made to apply this to how managers think about their problems in a long-term project called the Management Learning Project.

Philip Bower of LBS suggests

that user friendliness will only come about as a result of people being able to design their own systems at a very low level.

The LBS project points the way toward systems which are capable of adapting to their users' needs. This inevitably means building some sort of intelligence into computer systems.

The field of artificial intelligence has received a great deal of attention since the

Japanese has given a new boost to the subject, however. Certainly, some of the ideas put forward by the artificial intelligence community would seem to offer possible solutions to the problem of improving the interface between people and machines.

The area of expert systems (or "knowledge engineering") has received special attention in the Alvey Committee report, now awaiting government ratification.

At present no one is quite sure what these new systems will offer in the way of improved interfacing, but there is a lot of evidence to suggest that a key quality of such systems would be their ability to adapt to their users.

At the same time a great deal of potential lies in these systems' ability to pass on knowledge to people. The example already in existence essentially capturing the knowledge of a human expert inside the machine, include mineral prospecting systems, medical diagnosis and chemical analysis systems.

Some software researchers are talking seriously about applying these systems to the development of software itself. That is probably the expert system we need most of all.

Philip Manchester

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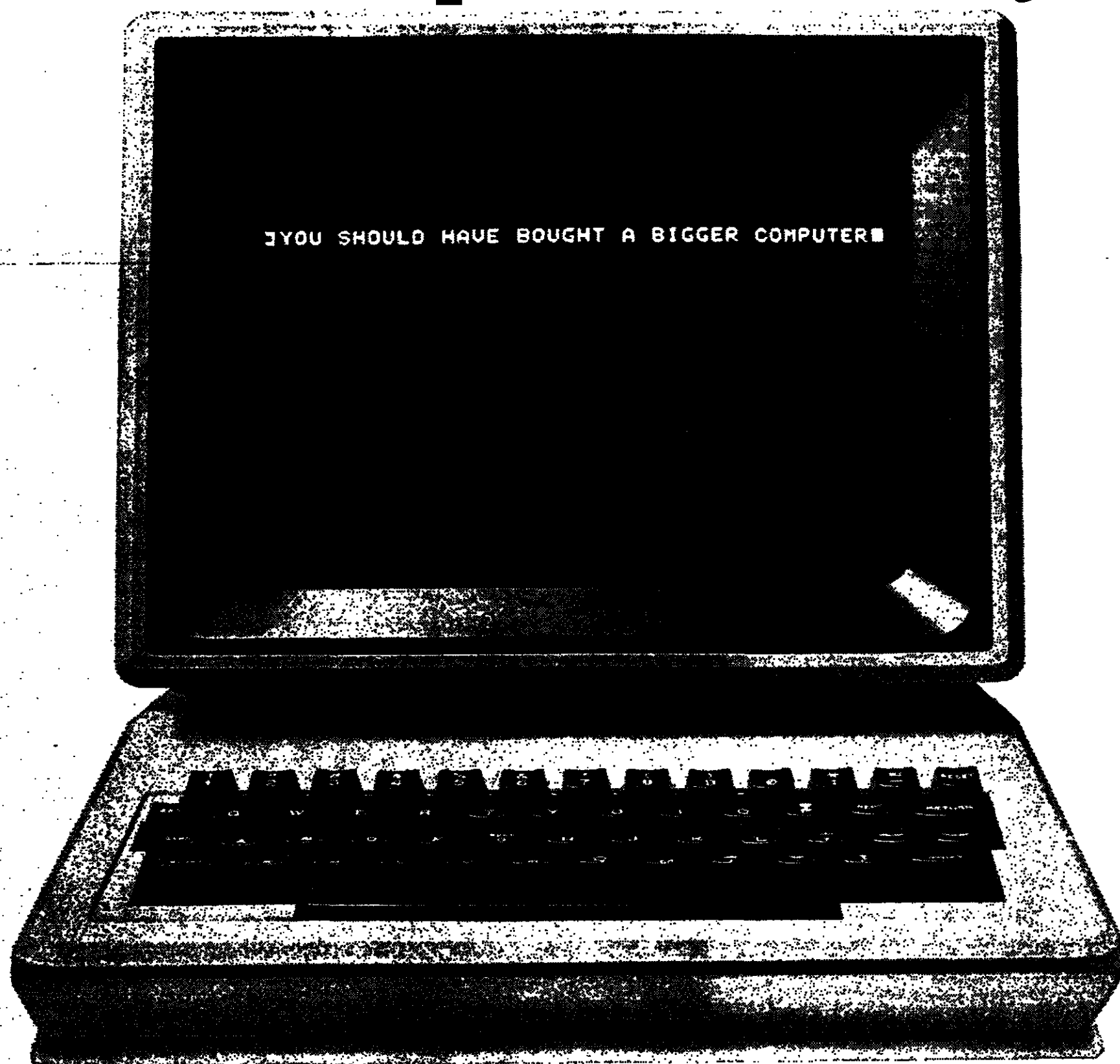
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Increase in local area networks

CONTINUED FROM PREVIOUS PAGE

For example, Acorn Computers has developed Econet—a cut down version of the Ethernet system. Its idea was to produce a very cheap system which could be used in schools so that microcomputers could share expensive resources. However, it now believes that its system will be of benefit to small companies which also have similar cost restraints.

As the demand for communications between computers grows, so will local area networks becoming increasingly important. Data communication is speeding up and it is not just within a single building that there is a need to link machines.

Eventually, local area networks will be expected to spread over much larger areas than we are used to, with many miles instead of several hundred feet separating computer users. In computer jargon, networks then become wide area networks, or WANs.

As illustrations of the advanced work going on in the field of high speed communications and networks is Project Universe which had its first public demonstration in the UK last month.

Project Universe is a collaboration between government, industry and universities. It is a three-year study to assess the practical problems of linking large computer systems over long distances at high speed.

It brings together the concept of local area networks and high speed satellite links for the first time. The major participants in Project Universe are the Department of Industry, the Science and Engineering Research Laboratory, British Telecom, Cambridge University, University College London, GEC and Logica, and Loughborough University.

Other companies including, Orbis Computers, a subsidiary of Acorn Computers, BICC, Cifer Systems, and Marconi Avionics have also contributed equipment and design work to the project.

Industry is interested in the

same project because the transmission of high speed digital data between computers over both short and long distances is becoming increasingly important in business, industry and scientific research.

In Project Universe, participants make use of the Cambridge Ring local area network. In this system, packets of data of fixed length travel around the ring in one direction only—some systems send information both ways around the ring. The basic speed of the data from one station on the ring to another is one megabit per second. In a few years' time, data will travel at ten times that speed.

The rings are connected to satellite earth stations so that they can be linked to other local area networks, further

away in the system. Project Universe makes use of the experimental Orbit Test Satellite run by the European Space Agency to bounce the information from ring to ring.

An important feature of Project Universe is that it is very flexible indeed. It allows any computer devices at any of the main participants' seven sites, spread around the country, to communicate with any other site.

One of the aims of Project Universe is to test the feasibility and economics of this type of communications. Soon telecommunications authorities, such as British Telecom, will offer commercial high-speed links similar to that already used by Project Universe. Certainly, networks open up interesting possibilities for business.

Elaine Williams

COMPUTERS IN BUSINESS XX

Rex Winsbury surveys viewdata developments

IBM keeps the sector guessing

OF THE 24,000 customers of the Prestel viewdata service run by British Telecom, all but about 4,000 are in business rather than at home. Although there are new initiatives to spread Prestel to more domestic users, such as the Club 400 scheme being run around Birmingham, it is noteworthy that there are at least three significant innovations this year in applying Prestel still further to business.

September should see the launch of Business Micronet, the business version of Micronet 800. This initially offers games and other software to home users of computers such as the BBC micro, Apple, Tandy and Commodore.

The scheme has been devised jointly by Telemap, the viewdata subsidiary of East Midlands Allied Press, BT, and Prism Microproducts. The software is held on Prestel and downloaded on request.

Mr Richard Heese, in charge of Micronet, says that Business Micronet will initially offer two facilities. One will enable the home micro to act as a telex terminal, interfacing via Prestel with the standard telex network. It should, he says, appeal to the low-volume telex user.

The other will offer a sophisticated form of electronic mail. The user will be able to compose his electronic letter using word-processing software, dial up Micronet, and send it to the Prestel computer, which will store it until the recipient calls it down to his/her compatible micro.

Mr Heese foresees other applications, such as Medical Micronet, with information about supply of drugs; estate agents' user feed-back calculations for farmers; and using the micro to call up company information deriving, for example, from the Financial Times.

Essentially, the purpose of the Micronet concept is to harness the home and personal computer, which is often in the larger sizes used for business purposes, to the viewdata network. Micronet users can also take advantage of Homelink, the second new business service launched this year.

This is a joint development by the Nottingham Building Society and BT Prestel and

offers a range of banking facilities to customers of the Nottingham Society who deposit £10,000. This may later drop to perhaps £4,000, but initially it will be firms of solicitors, accountants, surveyors and other professional practices who are most likely to take advantage of the service.

A complex security procedure should protect the customer against fraud. It would be surprising if other UK financial institutions did not emulate this pioneer in home banking before long.

The third new departure is Prestel CityService, again a joint venture between British Telecom and a third party, September should see the launch of Business Micronet, the business version of Micronet 800

this time Intercom Videotex, a subsidiary of Inter Commodities, the commodity broker. This, say the partners, will offer a range of business information aimed at the clients of City institutions, in the areas of securities, foreign exchange, futures markets, commodities and money markets.

Unlike Homelink and Micronet, there is no exclusivity implied in this venture. The Financial Times, for example, is developing its own foreign exchange information service on Prestel, in addition to its regular business news and other business information. But IGV will have a role in the indexing of financial information on Prestel.

Such developments as these may or may not reverse the trend previously noticeable for business applications of viewdata to migrate to private viewdata systems rather than to the public viewdata service.

BT has for a long time been worried about the preponderance of business users on Prestel, on the grounds that almost any business application could be done on a private system, and that Prestel might be being used simply as a temporary testing ground.

Certainly, Britain is almost unique among countries developing viewdata in having a

substantial number of private systems in operation for in-company and other dedicated uses.

Such interest is not evident in, for example, West Germany, while the French system is in any case built on the concept of the public viewdata network simply acting as a communications intermediary between the terminal and the remote computer. However, both the French and German systems are at an earlier stage of development than Prestel, which must account for around half the viewdata sets in use in Europe as a whole.

The British motor industry has made use of private viewdata to provide dealers with up-to-date information about stocks and availability.

The most sophisticated private system is probably the Topic service run by the London Stock Exchange. This provides real-time price movements to stockbrokers and financial institutions, and enables brokers to send advice and recommendations in confidence to their particular client list, over the viewdata lines for display on the screen.

One clear way in which Topic has to differ from standard viewdata systems is that the stock prices on the screen are automatically updated before your eyes if a price change is fed into the main computer from the floor of the exchange.

But one move which BT and others will be watching closely is the debut of IBM in the UK viewdata market. IBM has the contract to set up the German PTT's viewdata network, which initially used Prestel software for its trial period. However, IBM is said to have run into trouble in implementing the contract.

In the UK, however, it does have a computer network with a viewdata capacity that could offer a rival networked service to BT for third parties to use. It recently took on its first public viewdata client—some one who had previously parted company with Prestel. IBM worldwide may or may not have grand ambitions in the viewdata field. As usual, the computer giant is keeping people guessing.

Some possible applications and implications of ISDN

Participant	Interpersonal communication	Man/computer communications	Computer/machine communication
Business users Government and public institutions Domestic users	Message store and forward Conference calls Mixed media communications Call redirection Charging information Hotel services Data communications	Point-of-sale Database systems Recorded services Educational programs Videotex Teleshopping	Security systems Facsimile interpretation Media conversion Alarm and monitoring systems for the home Slow-scan TV
Communications suppliers Computer suppliers Terminals suppliers Software suppliers	Telephone codes Picture phones Data terminal PABXs LANs Local storage devices High speed facsimile communications Management software	Specialised VLSIs Mass storage devices Fifth generation adaptive software Micro clubs	Remote process control Automatic information services—searching and selecting
Carriers (circuit providers): PTTs International record carriers Value added carriers Other carriers, eg SBS, Mercury	New market areas for value added services Tariff dilemmas Redirection services Address list codes	Provision of information services	Wired cities International standards Investment in new systems Abolition of private circuits Network management

Terence Westgate on new animals in the telecommunications jungle

Taming the ISDN

TELEPHONE COMPANIES throughout the world intend to introduce new and exciting services based on computer communications technology between now and the end of the century.

Yet although these Integrated Services Digital Networks (ISDNs as they are called) will have a significant effect on the design and use of future communications systems it is already clear.

● The implications are poorly appreciated.
● Standards have yet to be settled.
● There are a variety of ways to interpret ISDNs.

So what are these exotic new animals in the telecommunications jungle? An ISDN really implies that a galaxy of dramatically new services can be provided over the telephone if the system uses entirely digital signalling—the way computers talk to each other.

Of the four principal telecommunications areas—radio, direct satellite, cable television and telephone—satellite and cable TV have received the most publicity. Yet the telephone system can be and is used to communicate voice, facsimile, computer data and viewdata.

Telephone systems are moving from analogue—where the information on the line is represented by a continuously varying electrical current—to digital, where the analogue signal is coded as a series of

electrical pulses. Computers and computer-based devices understand these streams of pulses (or "bits") very well and can manipulate them in various ways.

Already most telephone conversations travel digitally for the "long haul"—it is the line between your handset and your local exchange that remains stubbornly analogue.

If the whole system from telephone handset, viewdata terminal or facsimile machine operates digitally, new electronic exchanges will have to be involved both at the public and the private (PABX) levels. British Telecom's System X is an example of a system which will eventually operate in entirely digital mode.

These sophisticated new exchanges will provide:

1. Very fast call set-up and clear-down times of typically less than one second.
2. Automatic call redirection.
3. Detailed billing.
4. Conference calls.
5. Storage of information.

So a new mix of products and services will be developed with considerable implications for customers, equipment and service providers and for the companies who provide the circuits. (The table sets out some of these possibilities.)

The issue of shifts in, of course, critical to the nature of product development and the ways in which they will be used. The dramatic reductions

in the price of computing over the last 10 years has proposed new approaches to their use in both business and the home.

Local Area Networks (LANs), which provide high speed digital circuits over limited geographical areas could in theory affect tariff setting in one of two ways:

1. Encourage a high tariff to compensate for the reduced use of the public service.
2. Encourage a low tariff to stimulate use of public services.

The adoption of wholly digital technology at the telephone handset level supports the

The need for standards has never been more urgent

notion of using the PABX as the centre of an integrated voice/data local network.

Again, the tariff implications are the same. The prospect of low cost computing with mass storage capabilities also suggests that a local group approach to the use of remote data bases and information services could be adopted.

For example, a local computer could access a remote data base, carry out predetermined search routines and store the results locally for access by the local user community. The effect on communication and information services would again be dichotomous.

The ISDN offers, on the other hand, the prospect of pre-programmed calls, fast set-ups and high speed data transmission, which would make access to remote services more attractive and possible from any telephone point.

To turn potential attractiveness into marketable propositions, however, requires sophisticated software to make the services reliable and attractive to the customer.

There also has to be a general appreciation and understanding of the standards to be adopted by the carriers so that services and users' equipment can be interfaced to the networks.

Further, agreement between carriers must be reached so that systems will be internationally compatible. Study Group XVIII of the CCITT (International Consultative Committee for Telegraph and Telephones), is the group currently considering ISDN standards.

While the situation which faces today's equipment suppliers may be less than clear, the potential user is faced with the question of investing in systems which carry a certain degree of obsolescence—or at least choosing which type of system offers longer term adaptation to ISDN. This problem of a technical migration strategy has two aspects:

● Equipment—terminals and switches.
● Software and operational routines.

The simple transformation of communications signals into digital streams can make a considerable impact on interpersonal communication systems. The concept of creating a message and having an online holding and forwarding agent to handle the reply has already created a new market in computer based message systems.

Today, these systems (for example, Telemat Gold) employ only text codes—in the ISDN era we could expect combinations of simultaneous voice and image.

Establishing local systems to interface to forthcoming ISDNs does offer some technical parameters and guidelines.

Establishing the procedural and operational patterns within and between organisations is a longer term, and in today's information economy a more difficult problem to face.

The need for standards has never been more urgent in the world of computers and telecommunications.

In spite of the international work of the CCITT, there are national variations in international themes in standards.

The need for integrating software between systems is a result of divergent approaches; in the UK a programme is underway to develop a junction between different message and text systems. In Canada Inet is another approach to the need for a Network Access Machine advocated by Davies and Barber in the 1970s to facilitate man-computer interaction in computer networks.

In the interim period between the present day and the full-scale implementation of ISDN, there will be a number of pilot studies. In the United Kingdom pilot trials will commence at the beginning of 1984 under the auspices of British Telecom.

Before attempting yet another high level evaluation of their technology, however, most organisations would be well advised to review the basic states of their communications and to consider whether technology can offer any more solutions until the digital revolution has been more thoroughly understood.

With the growing proliferation of low cost digital technology components, the need for a radical approach to total systems requirements and therefore specifications, has never been greater.

Plus ça change, plus c'est la même chose has rarely been more apt—for isn't ISDN a return to the all digital signalling of Samuel Morse of the 1840s?

Terence Westgate is a member of the Telematics International Group of consultants which specialises in the design and implementation of computer and communications systems in many parts of the world.

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COMPUTERS IN BUSINESS XXII

Steps are at last being taken to remedy the lack of a comprehensive set of international standards

Britain gives a lead in standardisation

FOR YEARS, computer manufacturers have mumbled darkly about the need for standardisation in the industry. Until 1977, very little positive moves were made in this area.

The coming of information technology has made companies realise that lack of standards—which would allow computers and related equipment to communicate with each other easily—is a barrier to the growth of

the business market sector. Since 1977, companies such as ICL and Honeywell in the U.S., in conjunction with the International Standards Organisation (ISO), have been looking at future standards which will make all information technology equipment able to talk to each other.

The concept is called Open Systems Connection. It is analogous to being able to operate

an electric kettle in any home in the UK using the same plug. But the implications go much further than this simple concept. Today, computer equipment of different makes can only communicate with each other if they are using the same interconnection rules.

Open Systems Connection plans for a day when the computer manufacturers take into account the need for communication from the earliest stages of product design.

The UK Government has become acutely aware of the need to design for such standards if the market demands for information technology is to be met and customers are not deterred by buying equipment due to lack of standards.

On March 14 the UK's Department of Industry proposed interim measures for standards

called the Intersect strategy, which is aimed at enabling British suppliers and users to introduce Open Systems Interconnection without waiting for the full process of international standardisation to be completed.

However, the Government is confident that these proposals will meet the international standards when they are finally agreed.

Work on Open Systems Interconnection has been under way since 1977. The problem of setting standards is immense as it not only involves computers, but also all the equipment which has to be connected to them. This includes taking into account the different uses of computers and related equipment such as in electronic mail, banking systems, facsimile, and all forms of communications.

For years computer manufacturers have deliberately avoided setting common standards because they did not see much benefit in allowing competitors easy access to their market share. Also the industry in the 1960s and 1970s grew so rapidly that companies tended to ignore systems outside their own design.

Now it is recognised by the majority that the growth of the markets in business applications such as information technology will be easier if products can be connected to other types of equipment.

The Industry Department's initiative on standards comes from a recommendation by the Focus committee, set up in 1981 and chaired by Mr John Butcher, undersecretary at the DoI. Manufacturers such as ICL and GEC, major users, British Telecom, research

organisations and standard setting bodies, such as the British Standards Institution, are represented on the Focus committee.

The Intersect strategy will lay down recommendations for standards in these areas of the technology where the International Standards Organisation—responsible for world standards—is close to a final standard.

The first documents on the Intersect strategy recommendations are likely to be available by the middle of the summer.

The DoI is so keen that companies take up the recommendations that it has reminded manufacturers that financial support can be provided through the Support for Innovation scheme. Under this, grants may be given to companies to assist in the development of new products and processes, as long as they use one or more of the Intersect standard recommendations.

Agreement on the final international standards may be some years away though in some areas it is already possible to see which standards are needed, some are already in existence and some need major modification.

The main bodies involved with Open Systems Interconnection and the CCITT (Comité Consultatif International Téléphonique et Télégraphique), European Computer Manufacturers' Association (ECMA) and OSI.

It is hoped with OSI to achieve a standard for the structure of software in computer systems, including the definition of software interfaces and protocol which allows any make of computer adhering to the standard to be interlocked



Mr John Butcher, undersecretary at the Department of Industry—a strong advocate of standardisation in information technology

vides the transfer and control of data over the communications lines.

3. Network layer. This controls the overall communications network and the computer devices connected to the system.

4. Transport layer. This controls the flow of traffic to other sites and communicates with the transport layer at these sites. This ensures the accuracy and completeness of information being transmitted.

5. Session layer. Here the conversations between users, authorisation of communications, and synchronising the network is monitored and controlled.

6. Presentation layer. How the information will be coded and presented.

7. Application layer. This provides the interface to the use applications on the computer and common services, such as file transfer and terminal support between different systems.

The benefits to this modular approach is that the user, especially with major systems, is protected from modification due to changes in the network. Modification means expense, the risk of disturbing business activities during system changes. It will enable users to buy each individual element—from terminals, to computers and modems—from the best and most competitive source. Users can build the system in a more flexible way and take into account new opportunities as they arise without major system changes. Thus, standardisation cannot come too soon if companies are to make the best of information technology.

Elaine Williams

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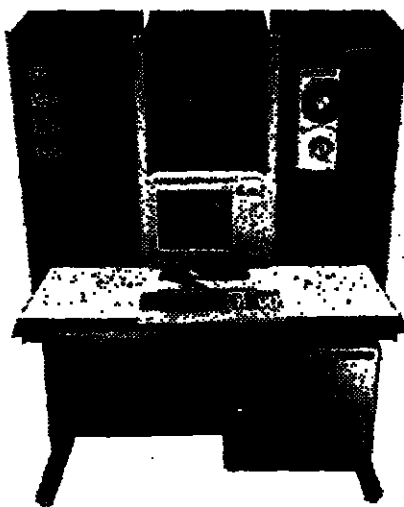
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Why several different industries seem on a collision course

Battle over network services

ONE of the most important, far-reaching and well predicted trends in office automation is the convergence of computer and communications technologies as a result of the growing impact of microelectronics.

This impending convergence has led to the widespread recognition that several rather different industries are moving slowly, but inexorably on a collision course.

Telecommunications companies, office equipment manufacturers and suppliers of computer hardware, software and services are beginning to offer products which are at least competitive.

Most major companies in these fields have outlined their strategies for office automation, which bear many similarities. Intriguingly they involve a mixture of data or information processing, the storage and transmission of messages electronically and general communications.

One of the most obvious points of overlap between the different industries is in network communications. Telecommunications companies see their private (and public) telephone exchanges looking and behaving increasingly like computers. Third generation PABXs (private automatic branch exchanges) not only have computer controls but also switch digital traffic.

Computer companies responding to the growing trend towards distributed data processing have also been making significant advances in their

communications hardware and software.

Office equipment suppliers have also been equally quick to realise the need for intercommunicating equipment. They have become the major force behind the development of local area networks, a variety of systems enabling a range of devices to communicate with an office or factory site.

The sophistication of most large communications networks

Major companies have outlined strategies for office automation which bear many similarities

is dependent upon the public telecommunications authority. Most international and local networks in the world are based on analogue telecommunications circuits, where data has to be converted for analogue transmission through modems and speeds can be limited.

Increasingly telecommunications authorities are just beginning to offer high speed digital transmission. In the UK, British Telecom has launched its X-stream services. These include high speed data links at two to eight million bits a second, a packet switched data service and planned satellite digital service.

A private sector competitor, Mercury, is also about to launch a high speed digital service in the UK. Both will be a very

important part of network planning in the UK.

The most evident development of networks, combining computing and telecommunications technologies, has been happening within organisations. Two years ago there was a strong move towards the development of local area networks with a variety of products including Xerox's Ethernet and the Cambridge Ring. However, the rapid development of truly digital PABXs has recently strengthened the argument that the internet telephone system in an organisation is the best form of distribution of data for many applications.

The installation of a local area network which needs co-axial cable running from point to point causes considerable extra work. Installation of local area networks has been very limited and largely experimental.

In many applications the fairly limited speed at which

data can be sent along a pair of copper wires used for the telephone is sufficient. Only when large volumes of information have to be transmitted at high speed does a high capacity network come into its own.

The importance of communications to computer companies is demonstrated by the growing links being established with traditional telecommunications suppliers. The link which has caused the greatest stir is between IBM, the computer giant, and Mital, the highly successful Canadian-based telecommunications group.

Other links in the U.S. include Hewlett-Packard and Intelcom, Northern Telecom and Rolm, Data General and Rolm and Digital Equipment and Northern Telecom. In the UK the largest indigenous computer manufacturer, ICL, is also offering a large digital PABX made by Mital.

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COMPUTERS IN BUSINESS XXIII

Alan Cane reviews a report out today which details how much has to be done before the automated office can become a reality

Slow dawn before the office of tomorrow

AN INDICEMENT of the UK's state of readiness for the coming of the "electronic office" is delivered today in a massive report by three leading office consultants.

The report, the "Orbit Study" written principally by Dr Francis Duffy of the architects and space planners DEGW, says criticism is easy: "But in reviewing the state of British office buildings, it is impossible to avoid."

At the dawn of information technology, we have offices which are totally unprepared for the challenge.

The report points to three principal areas of concern:

1. The physical limitations of existing buildings for the amount of new wiring and heat dissipation required.

2. Information technology is changing office organisation: existing buildings are not flexible enough to cope with the new demands of ergonomics at the workplace.

3. The new needs of office users are not being understood or being fed back quickly enough to the suppliers of buildings and services. The Orbit Study gives this warning: "The background to all three sets of problems is increasing uncertainty about whether we have too much or too little office space—in which, of course, so much money and hope is invested—and growing doubts about whether what we have is in the right place. Unless one takes an unrealistically optimistic line, it looks as if all offices will have to fight harder to attract tenants and users."



Dr Francis Duffy—architect, partner in DEGW and chief author of the Orbit Study.

many existing buildings are in danger of premature obsolescence. "This is because they will not be easy to modify in order to cope with the direct and indirect effects of information technology." Deep plan buildings are at greatest risk, it says.

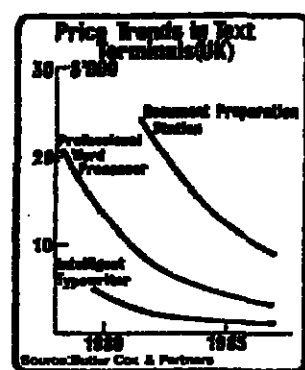
It also says: "Extensive and premature renovation of existing buildings will be expensive but inevitable and goes on to claim: "The cost of renovating certain types of office buildings to take on information technology may be equal to the cost of constructing new buildings."

From which dramatic assertions it might be assumed that the Orbit study deals with new and exotic forms of office therefore quite different in its approach and conclusions to the more conventional office automation studies, which are used as the past of many, the Orbit study is not.

These more traditional studies have generally indicated that the development of the automated office would be much slower than manufacturers were predicting; the results of the Orbit study suggest that even if customers were ready and able to install the most advanced office automation (O/A) equipment tomorrow, their buildings automation yet to emerge from the laboratory. Far from it.

The study concludes: "Most of the technology which will have the greatest impact on office design over the next 10 years already exists and is in use by leading edge organisations."

Looking ahead, the study suggests that in 10 years time, one in three office workers could be equipped with also-



conditioning systems with add-on capacity, a generous ratio of vertical ducting to floor area, generous and flexible horizontal trunking and the facility to be easily sub-divided for multi-occupation.

The worst performers have their services embedded in the shell so modification is difficult, ceiling height which rules out extra trunking or air-conditioning, shape which reduces space planning options and centrally controlled air-conditioning with poor response to extra and uneven heat loads.

There is a plethora of practical recommendations in the study—for example: "The new stress on services will make large, straight, simple, vertical ducts (at least 2 per cent of usable floor area) very attractive. Vertical ducts should be dispersed rather than concentrated and allow for a separation between power, telephone and data cable."

Recommendations addressed to the intended audience for the report—the suppliers of offices and their equipment—are more pithy.

For developers and estate agents, the report states: "Some buildings, particularly those of the 1960s, may not be worth renovating unless their location guarantees letting or some extra value can be added to make them more attractive."

Architects and engineers have to learn the basics of designing for information technology. "Designers in times of change cannot claim to be mere technicians, they must play a part in the forging of future buildings."

Builders should be able to link renovation with new work designed to provide better access to construction and servicing elements.

Furniture manufacturers will have to re-think their designs fundamentally: "It is in no one's interest to see expensive furniture components badly used for lack of expertise."

Equipment manufacturers have to appreciate that many environmental problems related to information technology are a consequence of the way the equipment is designed.

Greater user concern for ergonomic issues might force this to the attention of the manufacturer.

Users have to settle their internal differences to achieve effective space management. "If users are to get the offices they need and not waste their resources changing them to meet new requirements, they must give space planning much more importance and find ways of co-ordinating conflicting internal interests."

The Orbit Study Information Technology and Office Design, DEGW & Partners, 100, Strand, London WC2R 0AL, Tel: 01-675 3000, 01-675 3001, 01-675 3002, 01-675 3003, 01-675 3004, 01-675 3005, 01-675 3006, 01-675 3007, 01-675 3008, 01-675 3009, 01-675 3010, 01-675 3011, 01-675 3012, 01-675 3013, 01-675 3014, 01-675 3015, 01-675 3016, 01-675 3017, 01-675 3018, 01-675 3019, 01-675 3020, 01-675 3021, 01-675 3022, 01-675 3023, 01-675 3024, 01-675 3025, 01-675 3026, 01-675 3027, 01-675 3028, 01-675 3029, 01-675 3030, 01-675 3031, 01-675 3032, 01-675 3033, 01-675 3034, 01-675 3035, 01-675 3036, 01-675 3037, 01-675 3038, 01-675 3039, 01-675 3040, 01-675 3041, 01-675 3042, 01-675 3043, 01-675 3044, 01-675 3045, 01-675 3046, 01-675 3047, 01-675 3048, 01-675 3049, 01-675 3050, 01-675 3051, 01-675 3052, 01-675 3053, 01-675 3054, 01-675 3055, 01-675 3056, 01-675 3057, 01-675 3058, 01-675 3059, 01-675 3060, 01-675 3061, 01-675 3062, 01-675 3063, 01-675 3064, 01-675 3065, 01-675 3066, 01-675 3067, 01-675 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COMPUTERS IN BUSINESS XXIV

Systems perform with uncanny accuracy

How expert can a computer become? Alan Cane looks at ways that researchers are endowing machines with 'artificial intelligence'—the ability to make deductions on the basis of stored information

THE YEAR is 1984 and Mr Smith of Winston Smith Associates is at his desk at the beginning of the day. He switches on his workstation and using his keyboard conducts the following dialogue with his personal computer.

Mr Smith: Is there anything I need to know today?
Computer: Yes, today is a bad day.

Mr Smith: Give me the bad news.
Computer: Marketing—sales 20 per cent below third quarter projections; advertising costs increase 20 per cent; Finance—working capital down 18 per cent; 20 per cent of currency reserves decline; projected revenues for third quarter down 30 per cent.

Operations—Three month delay in circuit boards;

Expert systems depend upon the most rigorous attention to software technology.

absenteeism increases 8 per cent. Government—HR 32261 passes the House of Representatives.

Mr Smith goes on to ask the reasons for the turnaround in business and asks how sales might be improved.

Computer: Based on historical data and current projections, sales could be improved as follows:

Measures—cut the price of product by 26 per cent.

Projected results—Revenues increase \$2m for fourth quarter; earnings fall 10 per cent to \$15m.

Side effects—Could create a cash flow shortfall of \$1m.

This dialogue, taken from a new report from the Brattle Research Corporation is an example of a new kind of computer program, the expert or knowledge-based system.

The idea of knowledge-based systems is as old as computing itself; the expert system has become fashionable now because a combination of low-cost but very powerful computer hardware and advances in techniques of artificial intelligence has made possible the first, rudimentary products.

Rudimentary is perhaps too harsh a word. These are immensely sophisticated computer programs developed over many years which perform with uncanny accuracy. But they are rudimentary compared with the artificial intelligence experts' dreams of simple-to-use computer power.

Expert systems are among the first evidence of how successful researchers have been in endow-

ing machines with "artificial intelligence," the ability to store knowledge and to reason and make deductions on the basis of the information stored.

The idea is to provide specialists with the sum of human knowledge in a particular area at their elbow in the shape of a computer terminal with which the specialist can conduct a simple dialogue to unearth the information he or she needs.

The first few systems have dealt with scientific and para-scientific specialisms. One of the earliest was "Prospector," an expert system which assesses the suitability of a site for mineral exploitation; another is "Mycin" which diagnoses meningitis and prescribes the most effective drug treatment.

SPL International, a UK software and systems company which has developed its own general purpose expert system "Sage," describes it as a "computer system which reflects the decision-making processes of the human specialist. It embodies organised knowledge concerning a defined area of expertise and frequently operates as a skilful, cost-effective consultant."

SPL points out that Prospector can be used for about \$20 an hour compared with the hundreds of thousands of dollars lost in a drilling failure. Trials show that Mycin was more accurate than individual experts.

That Prospector, Mycin, Sage and a few other expert systems can be demonstrated is one proof that "knowledge engineering" is no longer just wishful thinking. There are others. Japan has set up an ambitious programme to develop the skills and technologies necessary for "Fifth Generation Computing," a concept that can perhaps best be defined as using reasoning machinery.

The UK Government responded to the Japanese initiative by setting up a committee under Mr John Alvey, senior Director of Technology for British Telecom. It recommended a five year, £350m programme to develop advanced information technology emphasising: "The programme should cover basic research and design tools in four key enabling technologies, software engineering, very large-scale integrated circuitry, man-machine interfaces and in-

telligent, knowledge-based systems."

Perhaps most significant of all, IBM, the U.S. computer giant, has been lecturing on expert systems in the person of Dr Louis Robinson, its director of university relations.

Just as the market for personal computers became "respectable" when IBM launched its own personal offering, so if IBM gives its blessing to experts systems, it is a clear sign that the market is set for growth.

Dr Robinson gave no hint of what kind of products IBM might have on the stocks, or when an IBM expert system might be launched, but there

is no doubt from the data IBM has collected on medical and other expert systems that it is taking the idea very seriously.

Expert systems will not be easy to create, especially in the area of executive information support. The Brattle study argues: "Knowledge-based systems are significantly more difficult to develop than current decision support systems."

A decision support system is a set of computer programs which makes it possible for an executive to get information from a large mass of data in a simple and useful form without special computing knowledge. "They are knowledgeable be-

cause relevant knowledge has been programmed into them. There are no tricks here; this takes time and effort. But in addition to having knowledge about things, they have knowledge about what to do with things; this adds another layer of complexity."

The report goes on: "Expertise and knowledge are often difficult to capture and characteristically require an extensive and tedious understanding of a problem or applications area."

What, in fact, distinguishes expert systems from other kinds of decision support computing is that in addition to the mass of information on which the

system is based, it also contains sets of rules for dealing with that information. These may be very complex; they deal with linguistics, for example, or they may involve the weightings to be given to separate pieces of evidence in a decision-making sequence.

Most of the early systems have been developed for socially worthwhile purposes—medical systems to aid doctors and to train medical students—but computer manufacturers' interest in these systems is not pure philanthropy.

They see the development of expert systems as a way of continuing to sell computers and

to different classes of user than has been the case in the past.

It is possible to predict that within a few years, each executive will have on his or her desk a personal computer, a small, but very powerful machine connected both to the executive's own files and to those of the company he or she works for.

Machines of this kind—the Apple Lisa, the Xerox Star, the Apollo—already exist. What does not yet exist is the means to make these machines simple to use by people who are not computer experts.

Dr Robinson of IBM touches on this point continually in his

expert system seminars. The advantages from the point of view of the manufacturer are obvious. The Brattle study points out: "If vendors, such as Xerox, who are stressing user-friendly interfaces do succeed in gaining market share as a result of their Star workstation (it features pictures on the screen to represent common office objects like files and filing drawers) then a major impetus towards expert systems that facilitate usage could develop in much the same way that the market for small business computers did."

It has already generated a new kind of computer specialist, the "knowledge engineer" among whose qualifications are the ability to ask specialists the right questions to get the kind of expert information that has to be fed into the computer's database.

* Artificial Intelligence and Fifth Generation Computer Technologies, Brattle Research Corporation, Boston, Mass., available from Korda and Co. in London at \$12,000 (telephone 01-726 8671).

Automation today is often met with little organised resistance, as John Lloyd reports

A radical change in union attitudes

UNIONS "approach" computers in a variety of ways: as representatives of workers whose jobs will change or disappear because of automation; as protectors of members' broader interests, which include privacy, civil rights and health and safety; and as computer users in their own right. Naturally, it is the first of these aspects which has received most attention, and is likely to continue to do so.

Unions have a dual approach to industrial innovation. The creatures of the industrial revolution, they understand well enough the necessity for technical change. As representatives of their members and as possessors of certain sources of leverage on management, they are often conservative because they must reflect the anxieties of their members or because they do not wish to give up the advantages which they have won within the status quo — the classic example is demarcation rights which "protect" jobs by assigning them to one group and denying them to others.

Union "luddism" (it should be remembered that the Luddites were unorganised, one reason for their random and self-defeating violence) is usually directed not so much against new techniques, machinery or systems, as against a

shift of advantage to management which the systems bring in.

Little of this was evident in the UK unions' reaction to computers during the first days of their introduction into business and industrial life in the 1950s. The TUC's first "automation debate," in 1956 was prefaced by a statement from the General Council which noted that "the major jobs of trade unions will be to keep automation within the field of industrial relations. Automation can make a substantial contribution to social

New technology agreements tend now to be confined to office applications.

well-being but there is no automatic transfer scheme to ensure this."

By 1970, the TUC saw more cause for alarm as a report to it noted that computerisation was taking hold in labour intensive areas; but the report concluded that all technical change ushered in new demands for new products, and hence generated new employment.

A radical change in approach has been apparent in the past five years, as unemployment has begun to climb. While the unions have been careful to place the primary responsibility on monetary policies, they were aware that at the same time as these policies were reducing demand and thus employment, a radical restructuring of work practices was simultaneously taking place in all advanced industrial societies.

The coincidence of these two events has often been fortuitous for company managements, who have been able to innovate and introduce new systems while unions were weakened by unemployment and while recession masked the effects of automation.

Organised labour has also often accepted, often reluctantly once the point has been dramatised with reference to bankruptcy, that labour-saving automation is necessary to render their industries effective with competitors elsewhere — the car industry worldwide being the most obvious case in point.

Thus unions in recent years have regarded automation much less benignly at official level, even while they have often been forced, or persuaded, to accept it without opposition in the plants. In 1980, in the third

debate on technology and jobs which had taken place in three consecutive years, the tone was sombre and rather bitter. Bill Whatley, the centrist general secretary of the shopworkers' (whose members were seeing automatic stock control and electronic payment systems cut swatches through employment and recruitment) voiced the views of many when he said that the employers were "using the recession as an excuse to avoid discussing with their workpeople the way that new technology should be introduced, the way that benefits should be shared, the protection that needs to be built in."

"I do not want to be over-cynical but I believe that employers are quite deliberately reducing their labour force before new technology is introduced, so that they can say that the job loss is minimal because of the new technology."

The main response from the unions, one which has been in part successful, has been the conclusion of new technology agreements which seek to regulate the introduction and rate of technical change. These tend to be confined to offices, and to be further confined to the health and safety aspects of visual display units; however, some of these agreements include provisions on training, on job security and give the

union(s) some say in designing the systems which are being installed.

As unions' powers have weakened under recession, these agreements — which were numerous in 1979-80 — have tended to fall away and where signed, are often very limited indeed in scope.

In manufacturing industry, the increasing automation now

Organised labour accepts, often reluctantly, that automation is necessary to keep industry competitive.

being introduced in the automotive sector is rarely the subject of an explicit agreement governing its introduction, but is subsumed within the normal process of collective bargaining on pay and conditions.

The nature of robot introduction at BL and Ford has been such that robots have been introduced on wholly new models, as the BL Metro and the Ford Sierra: the unions therefore, had no direct com-

parison with manning levels before and after robotisation, and thus opposition to their introduction could have proved difficult even had they been in a position to do so.

Unions and the labour movement have at times been active in expressing concern over the issue of privacy — that is, ensuring adequate safeguards on personal information stored in computers. The UK, as the Report of the Committee on Data Protection pointed out, compares badly with other countries on the levels of security it demands, a state of affairs which could lead to commercial problems if other countries refuse to interchange data with the UK.

In one case, at Lucas, unions representing white-collar staff have signed a privacy agreement covering personnel and other records which is probably unique in the country. They did so in part because they were able to persuade the company — a multinational — that it might be in breach of other stated laws if it did not institute the provisions demanded. The Lucas unions may provide an example for other groups to follow, though there has been little sign of this so far.

John Lloyd is joint-author with the editor of *Technology and Industrial Change*, just published by Corgi Press at £12.95p.

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